Industrial Finishing

Reg. U. S. Pat. Off.

An Independent Publication Devoted to the Finishing of Industrial Products

Vol. VI, No. 10 AUGUST, 1930 $2.00 a Year

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Published by PRACTICAL PUBLICATIONS, INC., 802 Wulsin Bldg., Indianapolis, Ind

Eastern Representative
C. A. Larson
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FINISHES

From the Editor's Desk

QUALITY in finishing, as in everything else, eventually gets recognition, appreciation, acceptance and its just reward—this in spite of the tendency for many buyers to appear to be interested only in price. Quality needs no alibi, offers no apology.

A high quality finish requires not only good finishing materials, but it must be fortified by good workmanship and suitably controlled air conditions for the product before and during the finishing process. It costs more to produce, but the increase in cost can be compensated for by greater sales —after the quality and durability have become established. Quality, more than anything else, helps to bring in repeat orders.

One large furniture manufacturer, nationally known, has established a laboratory where all raw materials from glue to spring wire are tested. This laboratory must pass on the relative merits of every purchased material before it enters into the manufacture of the product. A department of this kind costs money to operate, but this manufacturer recognizes the need and desirability of such a laboratory to insure the use of quality materials in his highly advertised line. He is backing up his advertising with "the goods." This is just another answer in the affirmative to the question often asked, "Do buyers appreciate quality?"

W. H. Rohr

Managing Editor

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More Economical Schedules for Finishing Operations

BY
M. M. MILLER

Revealing what was included and what resulted in one firm's investigation and improvement of (A) the arrangement of its equipment, (B) the production process by operations and time allowances, and (C) the method of paying for, checking and inspecting all finishing room work

"The so-called business depression, which many plants are now undergoing, has proved a real boon to organizations that took time off from lamenting over hard times to look into their own make-up, review their processes and methods, and improve them. The plant described in this article is one of these progressive organizations and I think this account of what happened will be of interest to others."

M. M. Miller

A LARGE Eastern case-goods manufacturing concern found itself in a position with other woodworking plants, where the firm was forced to increase profits or shut down the plant. This condition was brought about by a nation-wide period of business adjustment which, in the case of this particular plant, actually turned out to be a blessing. "Hard times," it was called by some, but 'tis an ill wind that blows no good, and the management of this establishment, being experienced in the business, knew that the company's product was a staple article, a necessity, an economic good; that people still wanted and needed it. Business was available somewhere and everybody just had to work like blazes to get it.

The finishing department personnel had heretofore been paid on a man-hour basis. That is, an hourly rate for each man. The foreman was responsible for keeping the men busy and getting all the work out. To lower costs it was necessary to get more work out of the same group of men. Of course, the foreman could pep up his men and follow them up more closely, but at best this could only be a spasmodic, temporary effort with things settling back into their usual rut after a little while. It was felt, that what was needed was a wage incentive system that would spur the men on to increased endeavor and react to the mutual advantage of the employer and employe in decreased costs and larger earnings. With this in mind further steps were taken.

Wage Incentive Obstacles

The main drawbacks against instituting a wage incentive plan, and these are usual at most plants, were as follows:

A—The present procedure had been established for years; the men were accustomed to it and any change would prove costly and likely to meet with failure.

B—The great variety of work

handled (its major portion being custom built) and its irregular production discouraged production methods which are most ideal when the number of items manufactured are few.

C—The fear of lowering the quality of the work.

D—The present arrangement of equipment made volume production methods impossible, and the shape of the building made them difficult of execution.

The whole organization had to be pepped up from the salesmen down to the lowliest laborer in the factory. Increased profits were necessary and this did not mean to increase the price but rather to decrease the selling price and bring about a still greater reduction in cost. The cost reduction program was extensive and thorough, but I shall consider only the changes in the finishing department in this article.

Major Problems Presented

The major problems to overcome, before a wage incentive system of operating the finishing department was possible, included these three:

1—Having a steady, uninterrupted flow of work.

2—Establish a definite specified procedure for all work.

3—Determine a fair equitable rate of pay that would properly reward the workmen for increased effort—one that should be made after sufficient study so as to protect the employes against all changes until a change in operation or equipment was made.

A study of all of the problems was begun and gone into with the utmost thoroughness. Suggestions were welcomed from the employes, and those accepted were paid for. The outcome was gratifying.

Improvement Program

It was decided that the special work was to be considered as the main flow in the same way as is the flow of current to the trolleys on an electric railway system. The stock work was to be used as a storage battery to keep the main flow constant. This meant that the flow of work could be kept up steadily and uninterruptedly, as when the amount of special work temporarily diminishes, the stock work is shoved in to meet the need.

All equipment was overhauled and put in first-class shape. Dry-kiln doors were repaired; exhaust fans were cleaned out and supplied with new blades where needed. The air compressor was given new bearings and the motors operating the drying rooms were supplied with two-ply belts instead of single ply. In a plant operating on a production basis it was realized that delays are more expensive than upkeep, and these precautions were taken to eliminate these possible delays.

The equipment had to be rearranged to fit in with the procedure decided on. By judicious thought and care the procedure was so made as to make as little rearrangement as possible and yet at no time to sacrifice any of the valuable points needed in a well laid out production line. There was no shortsighted policy, but rather a careful, conservative, well-thought-out plan that did not go into extremes and yet one that considered every advantage to be gained by making a change.

The most important part of the program was yet to be accomplished. This was the establish-

ment of the finishing procedure and the determining of the rate and method of payment. One can hardly be considered without the other, as they are dependent on each other. Study of the method of payment brought about plans for the grouping of men for certain operations and working them singly for others, while a study of the methods of performing a certain operation naturally suggested the way in which that operation could be paid for.

Operations, Schedules Planned

All the work of the finishing department was then put on a progressive series of steps as is done with any straight-line production schedule. Each step was clear cut, decisive and independent of others as much as possible. The steps were laid out as follows:

1..... Sponge
2..... Sand
3..Inspect; Putty holes; Prepare for staining
4..... Stain
Allow time for drying
5.....Fine Sand
6..... Fill
Allow time for drying
7..Inspect; Clean; Prepare for 1st coat
8.....First coat
9..... Shade
10..... Sand
11.....Second coat
12..... Sand
13.....Third coat
14..... Rub
15.....Final inspection

Each of the above operations were studied and, not only were rates established but the correct method of performing each one was decided upon. It was no easy matter; it took months to establish these schedules and they had to be checked and rechecked. I will take up the operations in turn.

1—Sponging is one of the easiest and quickest operations to perform, yet it is one which absolutely cannot be slighted. It was carefully considered before being put on a piece-work basis. The basis of pay was *square feet of surface sponged*, with a bonus for no defective work. The bonus amounted to more than the piece rate, so that the men could well afford to take the utmost care, as even one slighted piece lessened their bonus considerably.

2—Sanding was paid for on a square foot basis.

3—The inspectors chosen were men of ability and experience and of unquestioned integrity. These men were all paid on an hourly rate. The inspector examines operations No. 1 and No. 2 and makes any rejections necessary. He also prepares the work for the staining operation by puttying up all cracks, corners, etc., that may need it. This paves a clear way for the stainer.

4—Staining is paid for on a square foot basis, the rate differing with hand staining and with spray staining.

Drying is not listed as a workman's operation. All work of handling incidental to drying is performed by the inspectors or other men working on an hourly basis.

5 & 6—It was found that the task of fine sanding and filling worked out best as a group operation. Usually more sanders are needed than fillers, but many times it works out vice versa. One sander and one filler compose a group. If the sander finishes his task sooner he will pitch in and help the filler and should the filler get ahead he will commence sanding. Rate of pay is on a square foot basis.

7—All work up to this point is now inspected; then the surfaces are cleaned off and prepared for the first coat.

8—The work is given its first coat with a lacquer sealer. In-

structions as to spraying are complete and must be followed by all sprayers. There is no question as to how much to overlap the spray or how to adjust the nozzle. These details have been predetermined. Spraying is paid for on a square foot basis, with a slight increase in rate for work over a certain size due to the additional handling necessary.

9—All work in this plant consists of "color-of-sample" jobs, and often shading is needed after the first coat to match the color. The shading is done by men working on an hourly rate.

10—Sanding is paid for on a square foot basis.

11—The second coat is treated the same as the first coat (operation No. 8).

12—Same as operation No. 10.

13—Same as operation No. 8.

14—The rubbing operation is performed with pumicestone and oil. Rubbing is done both by hand and by machine and for both there is a different rate of pay. Both rates of pay are on a square foot basis.

15—The work now comes to its final and complete inspection. Any places needing touching up are taken care of and the completed items are ready to leave the finishing department.

It is the purpose of this article to cover the salient features without going into too much detail, but there are so many interesting and practical phases to consider that many details cannot be omitted.

How the New Plan Worked

The procedure just outlined may sound complicated but its simplicity is really remarkable. The surface square feet of each item is determined in the designing department, placed on the detail and cutting bill and is also stamped on an unexposed surface of each item where the workman can see it.

A tag with 15 perforations, separating as many tabs, follows the work through. One tab is torn off and sent to the office as the corresponding operation is completed. This tag conveys complete information to the office as to all payments to be made. The foreman is still retained and his position is strengthened. Inspectors work directly under him and at the same time he acts as a general inspector, besides fulfilling what executive duties he may have.

As a sample of actual finishing time taken on a 36x72-in. table top, I list herewith the following "times," which other factories may compare with their own schedules. The wood is birch finished in a dark imitation walnut.

Sponge	30 sec.
Sand	10 min.
Stain (Hand)	7 min.
(Spray)	1 min.
Fine sand & fill	18 min.
1st coat	1 min. 50 sec.
Sand	5 min. 45 sec.
2nd coat	1 min. 50 sec.
Sand	5 min. 30 sec.
3rd coat	1 min. 45 sec.
Rubbing (Hand)	30 min.
(Machine)	9 min.

The times which the men are actually paid for in determining the piece rate or square foot rates of pay are more liberal than the times shown above, as they take into consideration allowances for delays and fatigue, for handling of the work, for adjustment of equipment, etc.

After the whole program had been put into force and was operating, the results were reviewed and, as has been said at the beginning of this article, were found gratifying.

The finish of the product was improved.

The cost of finishing was considerably lowered.

The workmen were obtaining larger earnings.

Conditions in the finishing department were generally improved; the morale was bettered and more sincere cooperation was obtained.

Lacquering "Whoopetops"

A new toy, the "Whoopetop," is made from two pieces of turned wood and furnished a wooden holder and a strong cord for spinning. In the finishing of this toy, problems have been met and solved in a way which I believe will interest other small manufacturers confronted with the finishing of small wooden articles.

The Whoopetop outfit consists of a knob-shaped turning 1¾-in. in diameter, that has a ⅝-in. center hole into which a round peg 3½-in. long is inserted. An accessory to the outfit includes a ¼x1¼x4¾-in. stick, with a ⅝-in. hole near the end, which the youngster holds in spinning the top. The turnings are turned and sanded in one operation on a common lathe. The "rounds" for pegs are finished in 3-ft. lengths by being dipped in tubs of colored lacquer. Two coats are given the pegs, with 20 minutes drying time after each coat. When dry, they are cut to the 3½-in. lengths.

These pegs are next driven into the hole in the knob-shaped turnings, and then the heads of the tops are either dipped or sprayed with lacquer—the dipping method being employed for solid-color tops. For blended colors, which give a fine appearance to these articles, the smallest kind of touch-up gun obtainable is used.

In connection with the dip-finishing process the lacquer drip from the turnings bade fair to spoil the perfect finish until a specially designed drying rack was placed in service. This consists of a heavy plank having

Finished tops in position in drying rack

three rows of ½-in. holes bored a little way into the top surface. Holes in the outside rows are bored at an angle of about 45°, but those in the middle row are bored straight in.

The pegs of the tops are inserted in these holes while the heads are being sprayed or, in the case of solid colors, just after they are dipped. A girl, seated at a bench, removes the drip from the lowest point of the tilted top with her finger and then turns the top half way around. When a top is dry, it is placed temporarily in the middle row of holes.

The tops are given two coats of lacquer, with about 20 minutes allowed for drying time after each coat. No sanding or rubbing is done during the finishing process. When completed, the peg or stem is one color, while the head is another color. The flat spinning stick is usually the same color as the head of the top. These sticks are finished, a number at a time, by stringing them on a rod and dipping them in lacquer.

On the tops that are finished in a single solid color, production is speeded up by mounting a large number in upright position on a board, which contains sharpened metal points, and then spraying them all at one time.—J. C. Coyle.

Finishing Airplane Fabric

By
GERALD P. YOUNG

The author, with U. S. Army Air Corps (Material Division) at Wright Field, Dayton, Ohio, analyzes the two major reasons for finishing aircraft fabric and explains the what, why and how of modern dope finishing from both engineering and sales standpoints

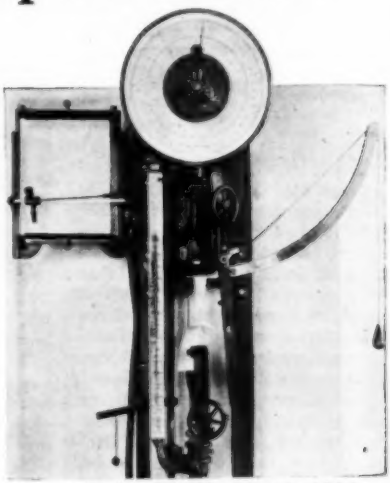


Fig. 1—Machine for testing strength of fabric.

WHY ARE the fabric-covered surfaces of airplanes coated and finished with the material commonly referred to as dope? There are two reasons for coating the fabric with dope. First, the logical and engineering reason is that without this finish, or some other of like character, the usefulness of the airplane and its performance would not be satisfactory. Second, the illogical—and what has become in many cases the most apparent—is that of producing a finish with sales appeal, the beautiful color schemes, the smooth, glossy appearance, the deep luster of the automobile body—all factors that help the sales department put across the sale.

One salesman has said, "A man who pays $10,000 for an airplane is entitled to a good finish." This statement is certainly true and it all depends on the point of view as to what constitutes this good finish.

The Engineering Reasons

Let us consider the first reason. The fabric-covered air-foil would lack uniformity in tautness without dope. This dope has the property of greatly shrinking when it dries, and in the period of drying it causes the fabric to become taut. A gallon of dope contains on the average about 10 to 13% of solid constituent, which remains in the form of a film when the dope dries. This, on a volume basis, is a relatively small part of the liquid material. The remainder is volatile solvents and thinners which evaporate and are a total loss insofar as the dry film is concerned. It is this volume change in the drying dope that produces the tautness in the fabric, and not a shrinkage of the cloth itself.

The dope fills up the interthread spaces, producing an air-tight film which helps to maintain the high and low pressure conditions that produce the lift in the airfoil. A pigmented color coat is applied over the clear dope to protect the undercoats and the fabric from the actinic rays of sunlight. The color, so long as it is opaque to ultra-violet, is unimportant. The completed film and fabric also protect the interior structure from the action of weathering.

These characteristics can be obtained by the use of four coats of clear undercoats and two coats of the pigmented dope. The weight of such a film will not exceed 4½-oz. per square yard. The fabric averages 4-oz. per square yard so that the weight of the finished surface should be about 8½-oz., an increase in the number of coats will add to the weight without increasing the value of the film in durability or performance. The small increase in the strength from added coats is not important, as the strength is already more than required.

The fabric surface of an airplane has a factor of safety of about one hundred times the wing loading. Grade A cotton fabric was not developed to meet the requirements for wing loading, but rather to produce a fabric that had a sufficiently high resistance to tear to keep it from being torn loose from the lacing. This Grade A fabric, in the undoped condition, has the necessary strength to carry a load of about 1500-lbs. per square foot. As the wing loading rarely exceeds 15-lbs., it can be readily seen that the factor is high. Doping adds slightly to the strength of the fabric, as determined in tensile strength, but it weakens it in resistance to tear.

The illustration marked "Fig. 2" shows a chart for the tear resistance of plain, undoped fabric and also for doped fabric. This chart was made with the recording attachment on the Scott fabric tester. The machine, set-up for the test, appears in Fig. 1. The undoped fabric under tear tends to have slippage in the threads and the threads bunch up so that the force required to start a tear is that necessary to break several threads at one time. With the doped fabric the coating holds the threads separate, each thread being surrounded by a layer of dope and being more or less fixed in place. Under these conditions each thread is broken in order and the force required is that for the individual thread.

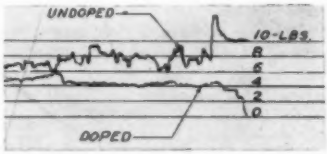


Fig. 2—Chart of tear resistance in doped and undoped fabric, as recorded by attachment on Scott fabric testing machine illustrated in Fig. 1.

As the added number of coats adds little to the strength, and as this increase is not required, therefore the increase in number of coats gives only added weight and if the structure be large this added weight is only unnecessary load.

Sales Reasons

Let us now consider the second or illogical reason for doping airplanes. In order to produce that beautiful, deep luster it is necessary to produce a thick film. There have been cases where as many as 15 coats of clear dope have been applied to build up a smooth film and completely con-

ceal the weave of the cloth. This layer of undercoats is then sanded and the color is applied, giving an oilcloth-like smoothness.

The sanding, if carefully done, has no deleterious results, but it is very, very easy to abrade the entire film and cut through the fabric. Recently I examined a set of four wings and found places on three of the four where the fabric had been cut by sanding, leaving weak spots from ¼ to 2-in. long. The color coats usually conceal these places, therefore they should be looked for before the color coats are applied. There is always a chance for a tear to start from these weakened points.

The Army Air Corps explicitly states that sanding of airplane surfaces will not be allowed. In some cases this smooth, heavy coating is obtained without the added number of coats. To do this, the dope used is compounded from low viscosity cellulose nitrate, a product generally used in the preparation of metal lacquers.

These metal lacquers also contain an amount of natural or synthetic gums which tend to produce a hard film capable of taking a high polish. The added gums also make for a brittle film. This type of finish is very desirable for the metal of automobile bodies where the supporting surface is more or less rigid, but when applied to a thin, flexible support, such as airplane fabric, it cracks and thereby defeats the purpose for which it was used. A few weeks of drying and this film will be of almost glass-like brittleness.

The man who was entitled to a good finish, and expected that it should look like an automobile body in polish and luster, is disappointed and expects the aircraft producer to recover the plane. The man who knows what the finish should do and why it is required will be content with lightly-coated wings for service and durability, and will look for the smoothness and luster only on those metal parts, such as cowlings and metal-covered fuselages.

Mark Test Panels Clearly

Recently I submitted some finishing materials to different concerns to be tested against their own materials of the same type. Several weeks later I called for a report on these materials and was able to get some authentic information on one test, as the panels were clearly dated and marked. Another test was worthless for my purposes because the markings were incomplete and poorly made. When making tests, it is of the greatest importance to mark the test panels clearly and distinctly, because it is from these notations that accurate conclusions can be drawn.—Joseph Cowan.

Distributes Conveyor Booklet

The Kurth & Knapp Mfg. Co., Inc., Detroit, Mich., has published a booklet on solving complex material handling problems. In addition to the descriptions and illustrations of conveyor installations, attention is devoted to details of the component parts of such conveyors. Other pages describe and illustrate the miscellaneous factory equipment and industrial washing machines made by this company. A copy will be sent on request.

Harris New Vice-President of North Bergen Varnish Corp.

The North Bergen Varnish Corp., 989 39th St., North Bergen, N. J., announces the election of Mr. William J. Harris as a Vice-President in the company. In his new capacity, Mr. Harris will continue in charge of production as well as take complete charge of an extensive plant improvement and expansion program contemplated by this company.

How We Finish Dalton Adding Machines

By
THOS. P. COLFER

Foreman Finisher of Remington Rand's Dalton Adding Machine Division explains his company's present finishing process wherein two auxiliary operations—putty glazing and sanding—have been subtracted from the usual metal finishing schedule

NEARLY all metal finishing is based on the same fundamental laws and principles. Of course, each division of the metal working industry has its own peculiar requirements and each plant its own specific conditions; but in the same division there is relatively little difference in the number of operations necessary to obtain an equal quality of finish, although it is possible to vary some of the operations and effect considerable saving in time and material.

Adding machine shell parts (of pressed metal) which will ultimately be finished, require numerous fixtures attached to the inner surface. This is done by spot welding, which operation causes slight indentations on the face side of the part immediately over the place where the fixtures are attached. Under ordinary procedure these parts would arrive in the finishing room with these slight indentations in their face sides, and of course these spots would require putty glazing, drying, sanding and cleaning.

We have developed what we call a staking machine, which operates similar to a punch press. The staking follows the spot welding. This machine is adjusted so that at each vertical stroke, the plunger automatically drives out all of the indentations left from spot welding—driving them a little farther than flush with the sur-

face of the face side of the part. These slightly raised areas are then brought flush with the surrounding surface by being pressed lightly into contact with a power-driven, felt polishing wheel.

As a result of this little extra machine work in the machine room, when we receive parts in the finishing department, the metal surfaces are clean and uniformly smooth. It is obvious that the staking and polishing operations are more economical than putty glazing and sanding, for, comparing the combined operations, the time is reduced at least 75%, with the added saving of two materials—putty and sandpaper.

Cooperation between departments means economy in production. It is just as easy to keep parts clean from the stamping department to the finishing room as it is to fill the metal surfaces with grease and oil. By strict observance of the rule of cleanliness, much time and labor is saved. Our parts are fairly clean when received in the finishing room and require only wiping off with a naphtha rag, racking and placing in the oven for 30 minutes at 400° F. to remove any grease which may remain in corners and around fixtures.

As they come from the oven, the parts are given a spray coat of black oil primer and returned to the oven where this coat is baked for one hour at 400° F. Parts are then inspected and any nibs are taken off with No. 7/0 sandpaper.

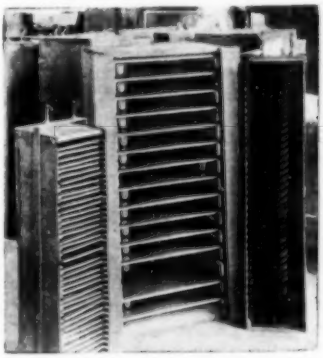
As far as our finishing schedule is concerned, we have entirely eliminated putty glazing, thus saving the time required to dry the putty, sanding and cleaning after sanding. In order to explain how this is accomplished, I shall have to digress from the usual finishing story and start in the machine department with the spot welding operation.

Next a spray coat of black finishing japan is applied and this coat is baked for two hours at 375° F. Following this, a second coat of black finishing japan is applied and baked for the same length of time and at the same temperature as the first coat.

The parts are then inspected, those requiring the trade name being taken to the benches where the transfers are applied at this time.

Parts requiring imitation wood grain follow practically the same schedule, with the exception that a ground coat is applied on which the wood grain is trans-

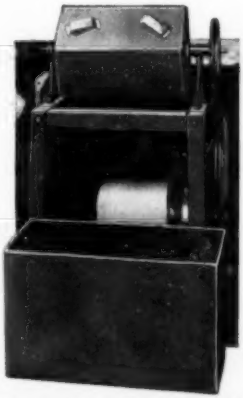
View of three racks used for transferring finished parts in the finishing department—in and out of ovens, from finishing room to assembly, etc.; parts are held in the finished-parts storage in these racks, thereby saving the wrapping of completely finished parts. The racks are constructed so that each machine part is entirely separated from the others to avoid any possibility of marring the finish.



fered by the copper-plate-and-rubber-roll method. The japan is omitted from these parts, all of the coats being baked on the metal and two protective coats of clear lacquer applied. Glazing and sanding are also omitted in this type of finishing.

In overcoming the glazing and sanding operations we have substituted two machine operations—staking and polishing—for two hand operations, shortened our finishing schedule, effected a saving of material, and we obtain a better surface on which to apply the finishing coats.

In finishing adding-machine handles—about 500 wood handles



The small outfit with which handles are tumble-finished.

are placed in a small tumbling barrel and about ½-pint of black lacquer is added. The "tight" lid is clamped in place, as shown in the accompanying illustration, and the handles are tumbled for 20 minutes. For this quantity of handles we generally add ½-pint of lacquer three times, tumbling 20 minutes after each addition of lacquer. This makes a total time of one hour, and about 1½-pints of lacquer to finish 500 handles. After the last quantity of lacquer has been added the "screen" lid is substituted for the "tight" lid to permit handles to dry.

What Causes Blistering

Blistering is evidence of the escape of minute quantities of air which have become trapped in the wood pores—under the finish, these "air bubbles" force their way up through the finish to the surface, causing and leaving a blistered appearance.

A difference in temperature between the finishing material and the surface over which it is applied may cause this. If the finishing material storage room is excessively cold during the winter, always place the material to be sprayed in the spray room for a short time before using it, to equalize the temperature. Also, see that the air purifier properly extracts all of the excess moisture from the air in the finishing room. —W. E. Warner.

Artificial lights should be installed with consideration of the kind of work to be performed under them.

Hard Rubber Protection from Corrosive Chemicals

American Hard Rubber Co., 11 Mercer St., New York City, has prepared a 54-page booklet, page size 8½x11-in., on its "Ace" hard and soft rubber linings and coatings for tanks, fixtures and fittings that are exposed in use to strong, corrosive chemicals. Ace rubber protection not only saves metal equipment from corrosion but eliminates the chemical reaction of metal parts with chemicals which often renders the chemicals unfit for use.

How We Tested and Selected Lacquer Finishes

By
E. F. WERNER

Superintendent of American Fixture & Showcase Mfg. Co., tells how his organization receives finishing salesmen, and how it has developed a plan of investigating and testing finishing materials which makes it possible to select lacquers wisely and on their real merits—for this company's purpose

"This article was finished before I received the July issue of INDUSTRIAL FINISHING *which contained that splendid article, 'How Much Total Solids in Finishing Materials.'*

"That article brings out some very important points, and yet I am sure that the writer can readily understand the quandary a buyer is in when it comes to picking out the most value for the money.

"Two other articles, 'Finishing Good Furniture on a One Day Schedule' and 'Latest Stains and Fillers for Wood Finishing' are right in line with our plans and experiments, so you can readily understand when I tell you that the July issue has made an exceptional hit with our entire finishing organization."—

MORE THAN 30 finishing material salesmen call upon us—most of them regularly. Thirty men with 30 arguments about their materials! Day in and day out the procession continues, and time and time again the same arguments must be repeated as to why we cannot use their materials.

We get "solid contents" as soon as we reach the office. "Build" and "sanding quality" are familiar friends of ours, and "scratch resistance," "durability," "print test," and the like, are every-day acquaintances. We are shot at and hit. So many questions are fired at us as to the various good points of the products we are using that it is impossible for us to answer them properly.

We have a serious weakness but our very weakness is a source of strength. We are not expert finishers who know it all. In fact, we know very little about the products we are using—that is, from a chemical content point. We admit there are a lot of things salesmen tell us, and things we read in the various trade journals, that sound like Greek to us, but we are trying as fast as we can to translate what we hear and read.

So, admitting that we know so little about the products we are using, and which are offered us, we are ready for the next step. We are absolutely open minded upon the entire subject of finishing and finishing materials. We have no outstanding preferences. In any case, it is up to the companies furnishing us our materials

to give us what we should have—not necessarily just what we want. Let me explain that statement:

Every Salesman's Privilege

Every man calling upon us to any extent has the privilege of visiting our finishing room. It is not a show place from the standpoint of equipment, nor is it the most modern, but we have nothing to conceal. We want the best material at the price we are paying, and it is up to the companies that sell us to see that the best materials are furnished us.

I am devoting every spare moment of my time to the finishing room. There has been more progress made in finishing materials in the past few years than in the whole time previous and there is no doubt but that the margin of profit can be increased or wiped out in that particular department more than any other one in the plant.

Knowing just what the material is to be used on, and seeing the material being applied, means that the salesman and company selling us the goods are to furnish us the best material available at the price we intend to pay. If, from their experience, they believe the material we have selected will not give us the best results, then they should promptly and frankly tell us so, and not allow some salesman from a competing company to find these faults. That has happened in several instances in our plant, and it just means that a new source of supply is found.

It is possible for the large companies to analyze the products they are purchasing and so set up standards that must be followed. But how is the management of the average plant to find out the quality of the goods it is buying? No standards have been set such as are found in other industries. No gauge for the measuring of the ingredients is available, and no assurance is had that the finishing material which looks the best when applied today will stand the wear and tear as well as another when examined six months from today.

Judging from Samples

It is hard to judge from samples. We know this: that if the lumber is kiln dried properly, sanded properly and then finished properly, it is almost impossible to judge which material has been used on the article. We have tried those tests. Different pieces were finished with the various sealers and lacquers we had, and most of them looked all right. What reason can we tell a man why we won't consider his materials when the various tests that we made show about the same results?

Of course, certain things can be readily seen. For example some of the sealers will sand just a bit more easily. That is a factor to be considered. Another point is the way one product builds up when applied in the same manner as another. Rapidity of drying, and print resistance, as well as scratch resistance, can be tried but, in all instances, remember the human element and personal equation enters into the matter.

So the matter of making a decision, and saying that one material will be used entirely, is a hard one. The personality of

the salesman and the various tricks of the trade that are legitimate in themselves enter into the question. Personal friendship between the salesman and the purchasing agent often swings the decision when it is hard to arrive at a definite point on account of the similarity of the products. Service rendered by the salesman, along other branches of the finishing game, are often influencing factors. All in all, it is tough on the purchaser and equally tough on the salesman who makes call after call with no results.

Getting down to brass tacks, we have our concrete problem. On most of our products we use a sanding sealer and either a clear or a flat lacquer. We are not a price house, which means that we are interested more in the quality of the product than in the first cost of the finishing material. Ultimate costs are the only costs worth considering, so that an offer of a few cents a gallon less does not faze us whatsoever. In fact, a salesman who opens his arguments with a discussion on price rather than quality of merchandise has little or no chance at all.

During our experimental work we had accumulated eight or nine samples each of sanding sealer and lacquers. These had been tried, and some of them did not show up well at all. Others showed up so well that it was difficult for us to differentiate between the various samples. However, none of them had stood out above the rest nor beyond the material we were using at the present moment.

Independent Laboratory Tests

An opportunity presented itself to have a number of samples tested in an impartial manner on a scientific basis. A standard had been set up by a testing laboratory which chemically and mechanically compared the various products placed upon the market and then explained these tests in such manner that the layman could understand them. Nine samples each of the various sanding sealers and lacquers, including the ones we were using, were sent away in plain cans distinguished only by a number which was known to us alone.

It is interesting to know how these tests are made. An arbitrary standard has been set up for each product. For sanding sealers they say five important factors enter into consideration. First, it is necessary to have the proper solid content, such as cotton, gums and the like. These solids must be blended in such a manner that the product will build up a proper coat when applied to the article to be finished. The sanding sealer must sand fairly easily in order to get the maximum production at a minimum sanding cost. It must resist scratching when dry and must, to a certain extent, be durable.

How Samples Rated

To each of the latter four important factors, namely, "build," "ease of sanding," "resistance to scratching" and "durability," factors of ten have been assigned. That means that if a product builds up to the highest possible extent, it will get a rating of 10, or 100%, and if it does not come up to this point it will get the rating the tests show.

Naturally, what the ultimate aim is would be a rating of 10 or a 100% in each case, but the very ingredients that give the

"build" might reduce the "resistance to scratching," and the things that make for "ease in sanding" no doubt lower the "durability," and so on. So the finish manufacturer can only place on the market that combination which, in his judgment, will give the best average of the points that most of the manufacturers (who use finishing materials) care to have. On the sealers the solid contents ranged from 13.55% to 26.45%. Five were more than 20%. Build ranged from 4 to 9. Five were 7 or more. Ease in sanding ranged from 2 to 10. Six were 7 or better. Scratch resistance ranged from 4 to 6. Six of them were 6. Durability ranged from 3 to 6. Seven were 5 or better.

For the lacquers the solid content ranged from 19.45 to 26. Five were 23% or better. Build ranged from 5 to 8. Five were 7 or better. Print resistance was 8 for every sample. Scratch resistance ranged from 5 to 9. Five were 7 or better. Durability ranged from 4 to 9. Six were 6 or better.

How did these figures react upon us? To the best of our knowledge the tests were impartial. No identifying marks accompanied the samples and we believe them to be fair. These tests may be all wrong from the standpoint of the best way to check the various products, but until some one shows us a better way, they are going to be given full consideration. We do not mean that they will be the conclusive tests, but the figures are going to be hard to refute.

The Price Range

Before going any further I wish to state the price range of the samples. With the exception of two of the products the price range of each and every sealer and lacquer tested is so close together that the small difference in price does not cut any figure at all, as the savings would not amount to much. The two lacquers were somewhat higher than the others in price.

Coming back to the tests. How can the manufacturer who has a solid content of 13.55% reconcile that figure with the five who had more than 20%? We have always been told by each and every salesman that solid content is the first factor in having a product that will build up and give a body to the finished article. How can the sealer that has a factor of only 2 for ease of sanding compare with the one that has 10? And the same reasoning holds true for the scratch resistance and durability.

The low durability of the sealers was explained in this manner. The product is covered up and the durability does not enter into a sealer to the same extent that a lacquer does. Another thing is the standard used. These sealers and lacquers are to be used for furniture and other inside work and so will not stand up if exposed to the weather, as outside finishing materials are; therefore, they are considered low in the durability factor.

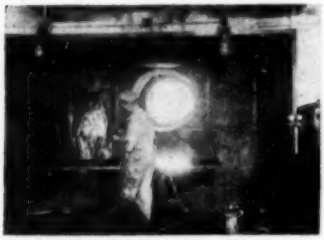
The difference in factors for the lacquers was not quite as great as the sealers, but still differed enough to make us feel that some companies are not giving as much for the money as others.

So now we have a standard to go by. Each and every salesman who furnished us with these

samples will have an opportunity to refute the results shown on their samples. We do not say that these tests are the last word in the matter, but they have set us to thinking and by the time we have seven or eight salesmen and their companies shooting at this standard, we are going to know more about finishing materials and their allied products. That is what we are trying to attain—the best products for our particular problem—and we know that these tests, and others that we are making will give us just what we want.

Lacquer Finishing in Small Plant

Approximately 90% of the store fixtures finished in the Charles T. Mackenzie & Son's plant, Denver, Colo., are lacquer finished. The use of lacquer has provided greater



Spraying finish onto a table top.

production on these articles and only one day is required for finishing almost any piece in the company's line.

Fixtures are first sprayed with a water analine stain and put aside to dry. In 15 minutes they are ready for the first spray coat of lacquer. Three to five coats are applied with from 15 minutes to one hour allowed for drying time and for sanding after each coat. The last coat, however, is rubbed with pumicestone and oil.

In this plant, the two-color finish is becoming more popular for tables and novelty furniture.

Spraying table legs singly in custom shop.

Tables are finished "knocked down" in two or four parts. The tops are laid on trestles for spraying. In shooting the legs a panel is laid on the trestles and the leg is spun by a helper who uses a stick with a projecting nail in it to hold the leg in upright position. Assembly bolts are inserted in the legs before they enter the finishing room, and these are used in handling the legs to avoid marring the freshly sprayed finish. A production of 300 legs per hour is attained in this way.

All fixtures, tables and cases are finished and shipped knocked down, resulting in a substantial cut in shipping expenses. A man is sent with part of the shipments to supervise setting up, but on 30 to 40% of the jobs this is not necessary.—J. C. Coyle.

In commercial automotive decorating the narrow and broad striping and brushed letters should be applied with specially formulated pyroxylin brushing lacquer having as good durability as the flexible lacquers.

Problems in

Finishing Birdseye Maple Veneer and Birch

By
T. R. NALL

Foreman finisher reveals some experience in finishing birdseye veneered panels framed in birch—how to bleach out the glue stains from birdseye maple, and the red from birch, preparatory to applying a clear lacquer finish

IN OUR SHOP recently we finished some birdseye maple panels, framed with birch for use in an elaborate decorative show window. The birdseye maple and birch harmonize so well that when they are correctly finished to match it is sometimes difficult to distinguish one wood from the other. But a job like this presents problems to the finisher, especially if thin veneer is used.

When the very thin veneer used today is glued, the glue often comes through the veneer in some places. Then, when a natural finish is applied, blotches are formed which ruin an otherwise beautiful appearance. I have found this to be especially true of birdseye maple veneers. The following method will remove these objectionable spots:

Bleaching Stain and Color

Mix 1-oz. of oxalic acid in a pint of hot water and apply this solution while still hot, with a rag. After about three applications, the spots will vanish. When the bleached surface is dry, wash it off with clean, clear water and allow it to dry before proceeding with the natural finish.

Since practically all birdseye maple is very light in color, while birch runs from white to red, the first thing for the finisher to do is to bleach the birch to the color of the maple. I suggest a bleaching lacquer to correct the color of the birch, and when this lacquer coat is dry, it should be lightly sanded with fine sandpaper.

Shellac and Lacquer

To finish the birdseye maple to match the solid birch frame work around these panels, we applied to the birdseye maple, one coat of shellac made up as follows: two parts white shellac and one part orange shellac (each a 4½-lb. cut) thinned with five parts of alcohol. After this shellac coat dried for five hours, we sanded the surface with No. 7/0 sandpaper.

For the second coat, we sprayed white shellac on both the birch and maple parts. After another 5-hour drying period, we sanded this shellac coat with No. 7/0 sandpaper. Then we followed with three coats of clear rubbing lacquer, allowing five hours drying time after each coat. After the final coat had dried, we oil-rubbed all parts. The result was a beautiful matched finish.

Maple wood has many peculiarities. Birdseye maple veneer is cut from the sugar maple tree.

The birdseyes are said to be the result of buds or shoots trying in vain to penetrate through the bark of the tree. Curly maple comes from trees that have grown in a twisted shape. Different effects in these highly-figured woods are brought out by special cutting methods.

Cause and Prevention of Pitting

Pitting resembles "pinholing." As a rule the pits do not extend clear through the film as do pinholes. Pits are shaped somewhat like miniature volcanic craters. There will be a sharp depression surrounded by a ridge—with, sometimes, a dark spot in the center. This fault is caused by the presence of oil, moisture or any other substance that will prevent proper drying. If there is a dark spot in the center, it is a safe bet that the cause is oil. Pitting is found mostly on varnish surfaces that have been sprayed.

The surface to be finished should be inspected to make sure that it is free from grease or whatever cleaning material was used —caustic, for instance. If the surface is found to be clean, an inspection of the spray equipment is in order. Too many spray guns on the line will cause the compressor to labor and get hot. Oil is apt to get past the piston rings and into the air line. Obviously, the remedy is a larger compressor or fewer guns. The regulator on the spray booth should be drained frequently; also the air filter.

If these precautions do not remedy the condition, it is probably due to moisture in the material itself, or because greasy benzine has been used as a reducer. The varnish may be heated to 140° or 150° F. to remove the moisture. To prevent a recurrence, the material should be stored in the dry as the moisture probably entered through a faulty bung. V. M. & P. naphtha will probably make a more satisfactory thinner for the filler. The manufacturer should be consulted on this.— R. J. Fairburn.

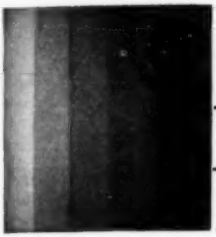
Why Finish Cracks

Cracking is usually caused by applying the filler too thickly, or not allowing sufficient time for drying between each lacquer coat. Always follow the material manufacturer's instructions as regards temperatures and drying times. I have known cracking to be caused by using preparatory and finishing coats from different manufacturers; the finishing materials were unsuited to one another; this doesn't always occur, but it's a possibility.—W. E. Warner.

Nitrocellulose was prepared by Schonbein, an Austrian chemist, in 1845. Its first commercial use was as an explosive, another early use of nitrocellulose was in photography. Since 1860 the usefulness of nitrocellulose in lacquers and enamels has been recognized, yet the modern lacquer finishes in which we are interested date back commercially only to 1923.

Ferro Companies Merge

The Ferro Enameling Co., manufacturer of procelain enamel frit and liquid porcelain enamels, and The Ferro Enamel Supply Co., the marketing organization for the former company, heretofore operated as independent units, have been merged into one organization which is called the "Ferro Enamel Corp."



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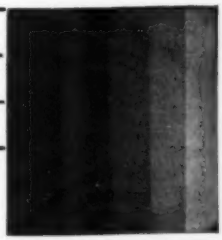

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Chicago Furniture Show Finishes

By
R. G. MEADE

A regular and careful observer's interesting and informative notes about woods, veneers, designs, finishes and decorative effects featured in latest furniture exhibited at the July Furniture Show in Chicago

IS AMERICAN furniture of the medium-price class about to become standardized? One who has visited all post-war exhibits could hardly believe otherwise if he were to stroll the corridors and visit the spaces at the Chicago Furniture Mart in July of 1930. Where semi-annually for at least eight years each display strove to outdo the other in the particular style or coloring of the moment, each seems now to preserve just enough difference to make distinction possible.

From the Crow's Nest

Endeavor if you can, to find a trace of Italian Renaissance or polychrome (1920), of French or Huguenot Walnut (1922), two-tone and gold vein-line (1924), Spanish Renaissance (1926), Moderne (1928); not a ripple is left to indicate that each in its turn dominated two or three markets to the exclusion of all but the most staple styles.

In their place we now see a curious repetition, in space after space, of maple, mahogany, oak and what, for lack of a better term, we may call walnut—and fancy woods. Reference is chiefly made, of course, to the bedroom and dining room exhibits, but it naturally follows in the novelty, cedar chest, library table and desk lines which must be allied in coloring.

Maple

Maple is practically all Early American in design and, when so shown, it is veneered in the curly rather than the birdseye figure. It is stained in what is now almost a standard shade of amber, ranging narrowly between an orange and a hazel-brown tone, and with little or no evidence of brown shading, save on spindles and turnings. The protective finish, occasionally polished, is more often dull or semi-gloss, and in varnish rather than lacquer.

Mahogany

The next standard suite is sure to be Colonial or Duncan Phyffe mahogany. The veneer is crotch on fronts, straight-grained on tops and sides, the color ranging from orange to ruby red; rare is the brown of yesteryear. More of these designs are richly polished than dull. As staples they are hard to beat for lasting beauty and livability.

Oak

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any of the 57 Antwerps, Bogs, Cathedrals and what not, but in the pure quill of Jacobean, Tudor and Elizabethan, if not Gothic. Carved panels in geometric and medallion designs, modified bulb

Sample of oak cabinet shown at Chicago Furniture Mart, with part of dining room suite manufactured by Globe Bosse World Furniture Co., Evansville, Ind. Size of top 16 x 40-in.

legs, and block or bun feet characterize the designs.

The finish ranges in tone from almost a natural to very nearly a black, including warm browns and yellows. Almost all are highlighted rather than shaded, the stain being a pigment wiping article rather than aniline, oil or water. The remainder of the finish is apt to be shellac and wax with sealer and flat lacquer on the better grades.

Water stain and filler may also be used, and the finish is almost universally a dull or eggshell shade; polished work looks badly. A representative and easily varied pigment-stain formula would run one quarter pound each of Van Dyke Brown and burnt umber in oil, one pound each of drop black and burnt sienna for 1 pint each of boiled oil and japan dryer and a gallon and a quart of V. M. P. naphtha.

Walnut

Walnut—and fancy-wood suites come last but far from least. However, as against six or seven different varieties on the same piece, we are apt to find simple combinations of butt walnut and curly maple or redwood burl or satinwood or oriental wood or Hungarian ash—two or three at the most. The riot of fancy woods induced by Moderne is definitely on the wane.

In decoration, virtually all of the standard resources are called upon —vein lining, inlay, two-toning, mouldings, carvings, overlays, striping and transfers. However there is little shading and no marquetry, oriental lacquering, gilt, stenciling, antiquing or painting. Also there is less attempt to use a wide variety of walnut cuttings and the finish runs to a medium polish rather than dull rubbed or high polish.

Bedroom Furniture

In the bedroom lines, pencil stripe walnut in sunburst effects appears less popular than heretofore. A number of suites are observed in quilted maple finished in a natural tone, trimmed with the same veneer stained gray. One or two others were chestnut, the one stained a taupe color the other a Jacobean brown, worm holes and all, neither shaded and both shellaced and waxed very dull.

What little enameled furniture appears is in two tones of cream and light green an almost standard

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James B. Day & Co., Chicago

THE DAY FINISH

Stain, Filler, Sealer and Lacquer — All in One Day

combination. Decoration is of the simple floral transfer or hand-painted type and in finish lacquer enamel seems more popular than undercoater and varnish; the former eggshell, the later polished. A gray and rose color spool bed suite attracted attention.

With metal beds, conservation is definitely in the saddle. Little is seen of color and veneer imitations too, are in simple combinations. As against the old Chinese red and black, we have gray and green; instead of sunburst effects in maple and stripe walnut we have satinwood and pale green; or oriental wood with black and gold inlay. Springs are now shown in lavender and green as against the once utilitarian black, brown or gray.

Dining Room

Conservatism too has taken hold of the dining room exhibits, most of which show at least one and sometimes two or three suites in oak. A few were two-toned, but many were in shaded effects. A danger would appear to arise from the tendency to shellac and wax; the wax will not stand hot dishes as will lacquer. Attempts to show oak in polished varnish were incongruous; it would be as appropriate to finish walnut or maple in red mahogany colors.

Walnut suites are simpler, alike in designs, veneer combinations and colorings. The violent contrasts afforded in years past but arbitrarily combining a profusion of illogically placed ivory overlays on brown walnut and heavily shaded mouldings have happily gone by the board. Walnut runs to a light pleasing brown with little or no shading, and much work is polished.

In the breakfast room lines, oak still predominated but minus the frosting once considered so essential. The work is filled natural and shaded brown around the borders, or filled gray and shaded in blue. The painted suites feature these combinations in two-tone, also turquoise green banded in yellow. Stencil decorations are scarcer than in the past but border decalcomania designs featured one noteworthy line.

Two-toned walnut dresser in polished finish shown at Chicago Furniture Mart by the Globe Bosse World Furniture Co., Evansville, Ind. Size of top 20 x 45-in.; mirror 24 x 30-in.

Living Room Furniture

Of the upholstered lines there is little to say in view of the fact that almost no wood shows, and this is in standard shades of brown walnut, mahogany and maple. The novelty lines, once so startling, feature dignified walnut veneers in light brown. Card table sets feature green, yellow and red with running transfer designs on edges. One beautiful card table shows a

Murphy Flexible Lacquers
withstood the Antarctic rigors

The wintry blasts and biting cold of sub-zero South Pole weather meant nothing more to the Murphy finished snowshoes, skis and sleds than to the fur-clad Arthur Walden and his fur-clad dog.

All of the snow equipment used on the Byrd Expedition was made by the W. F. Tubbs Company of Norway, Maine, and all of it was finished with Murphy finishes. Most of the material used was of special specification. The skis were finished with three coats of the famous Murphy Flexible Lacquer.

For all kinds of finishes on all kinds of surfaces the Murphy Varnish Company already has, or will make up to specification, the right material of the highest possible quality.

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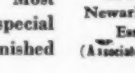

MURPHY FINE FINISHES

Famous for 65 years among architects, master painters and makers of products requiring a fine finish

curly maple center veneer with zebra wood border.

Wicker and Porch

Reed furniture embodies the last stronghold of Moderne design but in subdued colorings: dull reds, greens and browns. There is little shading except on natural and few attempt even two-toning. Lacquer enamel has been found most satisfactory for this work, as is also the case with much porch furniture.

Kitchen and Refrigerators

After a burst of coloring, refrigerators, except for a standard two-tone combination of white and green, are returning to pure white. Kitchen cabinets show natural oak shaded in strawberry red, brown or green or gray shaded with blue, both in stain and clear lacquer or lacquer enamel throughout. Painted legs to match colored porcelain tops in tables are popular.

Finishers' Health Hazards Can Be Avoided

By
W. R. BEUTIN

What can be done to protect finishers from the fumes of poisonous liquids, the dust from sandblasting, and unclean hands smeared with finishing materials some of which may be more or less poisonous.

AFTER VISITING numerous industrial plants and other places where finishing materials are used, I must confess amazement at the frequent exhibitions of indifference to many health hazards which are permitted to exist in connection with the use of certain materials. While a majority of industrial establishments have installed efficient production equipment, comparatively few that I saw have taken any steps toward providing and insisting upon the use of facilities for protecting their finishers' health.

When materials containing benzol or lead compounds are used, strict regulations should be enforced to avoid the possibility of injuring someone's health temporarily or permanently. Really, it is desirable to avoid using the materials just named, since non-poisonous substitutes for lead and benzol have been developed to the point where they are entirely satisfactory for the work required.

Benzol Dangerous

Many employers lack accurate information as to the possible hazards that exist in materials containing silica, benzol and lead compounds. Definite information should be furnished by the manufacturer of these materials as to the percentage of harmful contents, so that the employer of labor will not have to entirely

One of many different types of Paasche Fireproof Airfinishing Booths that meets requirements of all authorities.

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IF-8 Gray

rely upon the advice or recommendations of other manufacturers.

Benzol constitutes one of the most insidious hazards to workmen, as it is used in some stains, lacquers and thinners, and is a basic material in many paint and varnish removers. Benzol fumes cannot be removed from the air without chemical means. Even relatively small amounts of benzol in stains and lacquers will give rise to benzol concentrations in the air breathed by the spray operator or others working in the vicinity.

The use of harmless lacquers purchased from one source, with low priced thinners from another source, will almost invariably present the benzol hazard, as benzol is used in many cheap thinners. While benzol has a distinctive odor, one cannot detect its presence when it is mixed with acetates and such other materials as are used in the make-up of modern lacquers and thinners.

Materials less toxic than benzol are being substituted in many cases—such materials as toluol, xylol and similar diluents, which are not as volatile as benzol and which produce no harmful effects on the workmen. The use of these other materials not only reduces the hazards of spraying lacquer, but it also lessens the possibilities of blushing. Other substances that may be more or less harmful include methol or wood alcohol and denatured alcohol.

Considerable success has been achieved by substituting lithopone, titanium oxide, zinc and barium compounds for lead. These compounds are known to be entirely harmless, and many authorities declare they really are equal to the present standards of brushing, spreading and covering qualities, and also superior in durability.

Facilities for Cleanliness

A dangerous element in vitreous enameling is silica. Unless the worker is adequately protected, sandblasting will be both disagreeable and hazardous to him.

Poisoning from certain finishes arises from inhalation of the dust produced by sanding between coats, using glazing putty, fumes from burning off old paint, contamination of food by unwashed hands, or breathing fumes from sprayed lead paint. From a health standpoint, wet sanding is preferable to dry sanding whenever possible.

Dangerous practices generally arise from loose enforcement of safety rules or from lack of such rules. In some plants only cold water is available for washing, while in others warm water and soap and towels are supplied but, due to limited facilities, only a few can wash at a time. As a result some men rather than wait, go home unwashed. Usually, workmen are reluctant to admit that they are not feeling well, believing that they will be considered faultfinders or weaklings and hence become undesirable as employees, or at any rate not in line for promotion.

Use Respirators

Respirators should be provided for all work wherein the workmen might otherwise inhale undesirable fumes or dust. I have noticed that in some plants where respirators are supplied, the operators do not wear them, except perhaps when they think some official or inspector is watching. Very few workmen will wear respirators regularly unless conditions are extremely bad, or unless they are compelled to do so.

Unless the respirator fits the contour of the face it will not be

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3. Unequalled manufacturing facilities.
4. Technical chemical service.
5. Technical engineering service.
6. Sales and service organization.
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8. Color advisory service.

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100% effective. In regard to respirators, my suggestion is for the management to get the desired information and recommendations from one or more manufacturers or dealers in this equipment. The manufacturers probably have made practical tests with all types of devices and materials.

Causes of Cracked Lacquer Films

Usually, when a lacquer finish cracks, the first thought is that the lacquer material is at fault. Fundamentally there are many causes of ruptured finishing films of protective materials. For example,

1—Improper type of glue, or the water (moisture) solubility of glue.

2—Most furniture used today is constructed of plywood panels, the face veneers of which are quite thin and, after being thoroughly seasoned, the surfaces are very dry. This thin veneer usually absorbs considerable moisture which then increases the moisture content of the wood.

3—Unprotected edges permit absorption of moisture.

4—Veneers are not thoroughly dried.

I believe that the real cause of cracked lacquer films is due to the affinity of the wood to absorb moisture. Sometimes cracks in a film will not occur until two or three months after finishing has been completed. These cracks are the development of a strain on the film through the contracting and expansion of the wood itself, which indirectly is caused by the repeated absorption and release of moisture according to conditions of the atmosphere.

The types of ruptures are sometimes termed "hair lines," "checks" or "cracks," and are prevalent in the form of small hair lines mostly noticeable across the grain at which point the wood expands. The longer "crack lines" are noticeable with the run of the grain.

The moisture content of the wood, temperature changes in the finishing room or the storage room, may be responsible for this condition.

I recommend that when wood is thoroughly seasoned and brought up to the stage at which it is to receive lacquer coatings, the following schedule be investigated: For the first and last applications of lacquer, use lacquer of a flexible nature to insure a greater degree of contraction and expansion. Then sandwich in between these applications a "shorter" lacquer, either one or two coats, in accordance with finishing schedule.

The proper control of air, temperature and humidity will greatly decrease the possibilities of cracked lacquer films, and should not be overlooked.—M. C. Roberts.

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O'Neil Duro Co., 886 Greenbush St., Milwaukee, Wis., announces that a bonus of 5% of last years' earnings will be paid its employes. About 75 will benefit, the amount being about the equivalent of a weeks' pay.

Condensed Chemical Dictionary Second Edition

The Chemical Catalog Co. Inc., 419 Fourth Ave., New York City, has published a prospectus folder on its new second, revised and enlarged edition of The Condensed Chemical Dictionary. This edition contains specific information concerning 12,000 chemicals and raw materials.

ADVERTISING PAGES REMOVED

Vitreous Enamel Stenciling

By
P. C. BARDIN

Explaining the design and operation of both the sunken and raised ornamental designs, and revealing details of how to make, mount and use the stencils suitable for this kind of decorating.

THE METHOD of stenciling vitreous enameled products is unlike that used on any other finished surfaces. In this finish, stenciled decorations, names or trademarks are produced by removing a previously dried color coat from the surface areas exposed by the openings in the stencil; in all other finishes the stencil color is sprayed on over the stencil.

Two distinct types of stencils are used on vitreous enameled work—open and solid. The use of each one depends upon the kind of decoration desired. Open stencils will produce what is known as "sunken work"; if solid stencils are used, the result will be "relief" or "raised work." Sunken work indicates just what the term implies—the surface of the stenciled design is lower than the surrounding surface—while in raised work, the stenciled design stands out in relief.

Open Stencils

Open stencils for use on vitreous enamel finishes are made similar to those used on other finishes. If these stencils are to be used to any extent they should be cut out of celluloid or thin-gauge metal in order to better withstand the constant brushing, which would wear away the edges of a straw or fiber board stencil. The operation is simple.

Let us consider, for example, the refrigerator door shown in Fig. 1, on which the ground coat has been dipped, dried and fired; also, the first white color coat has been sprayed and dried. The open stencil (with V-shaped cut-out to form half of the hollow square) is centered on the door surface and the workman, using a bristle brush, removes the dried color coat where it is exposed through the cut-out of the stencil. Then, he turns the stencil end for end and lays it back in place to reverse the V cut-out which, when brushed out, completes the hollow square design, revealing the ground coat in the form of a hollow square—with center and field in white. After this and a succeeding white color coat (in 3-coat work) has been treated in this manner, the result will be a sunken square design. I might add at this point that it is possible and—if the volume of production warrants—expedient to use a stencil frame to be described later in this article under the solid stencils. As only one stencil is necessary to produce sunken decorations, this frame may be made single with one end left open to facilitate the insertion and removal of parts.

Fig. 1

Solid Stencils

Solid stencils are made just the opposite of the open type. The design is solid (instead of open) with the body of the stencil cut

away around it. Most of these stencils I have seen in service have the solid design held in position by ties or strips, and if the design is intricate, it is generally reinforced by linen tape. A great many plants use only one solid stencil to produce the design; in such a case, after brushing, the stencil is removed and, by careful painstaking work, the color coat is removed from the surface protected by the ties and reinforcements.

Acceptable work can be produced with solid stencils such as I have described, but it is impossible to obtain volume production economically, as the labor cost is obviously high. The original cost of such a solid stencil is low but, if used continuously, the maintenance cost is high and renewals frequent. It may be readily seen that it would be impossible to produce some of the larger and more complicated designs, and especially the single and double intricate borders used on some of the electric refrigerator doors and panels, with this type of solid stencil.

The alternative in solid stencils is the two and if necessary 3-stencil frame. A2-stencil frame is shown in Fig. 2. This frame is built of wood and has wood stop blocks along both sides and ends by which a refrigerator door such as is shown in Fig. 1, is correctly located in the frame to receive the stencil work. The frame illustrated here has a solid bottom; however it is possible to use a slat bottom if the frame is to be used on an exhaust brushing table. By exhaust brushing table I mean that the table top is covered with heavy wire screen and is directly connected to the exhaust system which removes the dust caused by brushing. Two metal stencils are hinged to the frame with loose pin butts as shown in Fig. 2.

Let us again consider the refrigerator door shown in Fig. 1, excepting that in this instance the square design is to be raised work. After the second white color coat has been fired (being the third coat applied) the door is returned to the spray booth and the stencil color coat is sprayed directly on the surface of the door.

Of course, in the simple design illustrated herewith, the color coat would be confined to the center portion of the door surface and spread over only an area sufficiently large to include the square design. After this coat has been dried, the door is placed in the frame under stencil *A*, Fig. 3, and the exposed surface is thoroughly brushed. The door is then shifted in the frame to the opposite end so it rests under stencil *B* and the brushing is repeated.

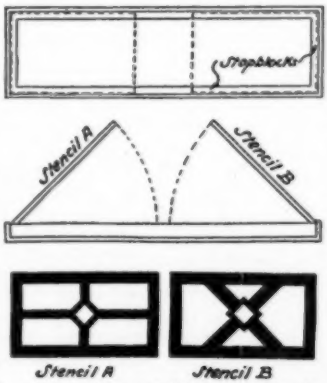

Fig. 2—Plan and side view of frame to which two stencils are hinged at the ends.

Fig. 3—Stencils for use in making raised hollow square design, see Fig. 1. These stencils permit the workman to brush away the color except where hollow square design is wanted.

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With the door rigidly held in position between the stops and the firmly fixed position of the metal stencil, a portable power brushing wheel may be used with a manifest saving of time and labor. The door is then removed from the frame so the last coat of finish can be fired. The square design in raised work, or in relief is the result.

It will be noticed in Fig. 3 that the solid metal bands or ties are located so that the square is perfectly formed by two brushings, without requiring the exceedingly careful hand work which would be necessary if only one solid stencil were used. The use of the frame permits instant centering of the door and, through the use of loose pin butts on the frame and stencils, various designs may be made—using the same frame so long as the size of the parts to be stenciled remains the same.

Stencil Designing

These stencils may be made to form any design, the chief factor being to cut each succeeding stencil in such a manner that the design will be gradually formed, and so that each stencil will make it possible to remove the color coat from the surface protected by the solid ties of the preceding stencil. A 3-stencil frame is made sufficiently long to accommodate three stencils, two of which are hinged at the ends as in the two stencil frame while the third stencil is hinged to a fixed wood bar in the center of the frame, and elevated sufficiently to permit the part to be stenciled to pass between the wood bar and the stop block necessary to locate the part under the center stencil.

This equipment for relief stenciling is in use today and has proved successful. Even though production is limited and a manufacturer may not find it expedient to use metal or framed-celluloid stencils, or even the frame, it is my opinion that two correctly fashioned straw or fiber board stencils are more economical than one patched up makeshift stencil, which may take less time and thought to cut, but which will cause more time and labor to be expended to produce acceptable work.

"Armorcoid," New Armitage Product

A new synthetic enamel is being introduced by the John L. Armitage & Co. of Newark, N. J., well-known manufacturers of black baking japans and baking enamels. It is claimed that "Armorcoid" closely approaches porcelain finish in enamel, having unusual adhesion, hardness of baked finish, in high gloss or dull as preferred. May be baked or air dried. "Armorcoid" is featured in one coat white, black and standard colors, suitable for use on metal furniture, auto parts and equipment, metal fittings of all kinds, etc.

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The Thibaut & Walker Co., (Mfr. of varnishes & japans) 46th Rd., Long Island City, N. Y., announces that Mr. Joseph Bang is now with the company in a sales capacity.

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O'Neil Duro Co. 886 Greenbush St., Milwaukee, Wis., announces the employment of Mr. Carl H. Siever (formerly with American Varnish Co., Chicago) who will be in charge of the manufacture and sale of Duro lacquers.

Interior Decoration Pamphlet

The Columbus Coated Fabrics Corp., Columbus, Ohio, has published a 10-page, pamphlet, size 3¼x6¼-in., on complete interior color schemes and plans. It was written by Virginia Hamill, style critic and decorator, and is entitled, "The Important Points of Interior Decoration."

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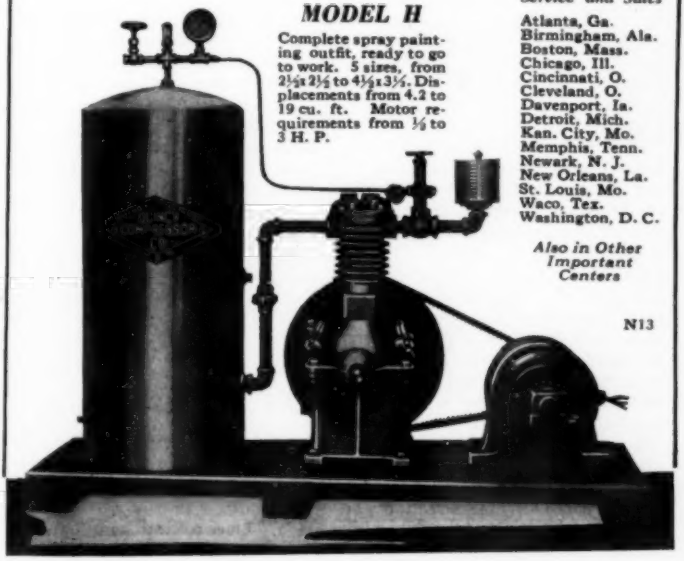

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N13

The Coloring of Celluloid

By
S. S. HARKAVY

Color Chemist explains what materials and mixtures to use for coloring modern celluloid articles such as knife handles, toilet articles, etc., by an effective dip-stain process

"I believe this article will prove of interest to a large number of readers. Of recent, I have done considerable work on the coloring of celluloid and I will be glad to answer any inquiries on the subject."—

Samuel S. Harkavy

THE CURRENT appetite for color in the common items of every day use has given the shrewd sales promoter an unusual opportunity to capitalize a fad. Combs and toilet sets to match the bathroom and boudoir, colored knife handles to match the kitchen—in fact colored celluloid articles of every description have found favor in the eyes of a "color minded" public.

The past few years have witnessed a large overproduction of colored celluloid articles, with the result that manufacturers have found themselves with large inventories and no outlet. I know particularly of a large manufacturer of popular-priced celluloid fountain pens who had an enormous quantity of yellow pens on hand. The yellow pen was no longer effective in attracting buyers but he found a receptive market when he re-colorized his old pens with the latest pastel shades. In this manner he succeeded in disposing of old stock and created a demand for the newly introduced colored pens.

Dip Staining

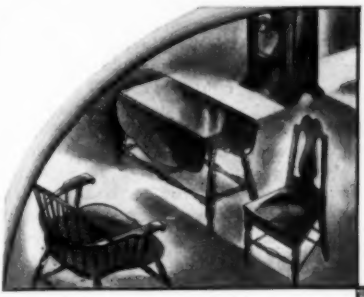
The coloring of celluloid is primarily a dip-staining process. The first requirement is to find a solvent that will penetrate the celluloid and carry the color along. Secondly, we must find colors that are soluble in the solvent. Acetone will answer the first requisite. Basic and oil dyes meet the second requirement. Of the aforementioned dye groups, basic colors are more widely used due to their brilliancy and coloring power.

Basic colors are sparingly soluble in acetone but we must have a soluble dye, not a "sparingly-solubie" one. Good color solubility is an insurance against specking and streaking. Therefore, to insure perfect color solubility we first dissolve the basic color in a small quantity of denatured alcohol, usually 15 to 20% of total solvent used, and then we dilute the solution with the remaining 80 to 85% of acetone.

A list of dyes that have good alcohol solubility appears in table I. It will be noted that browns

Yellow	Auramine Conc.
Orange	Chrysoidine Y. S.
Green	Malachite Green
Violet	Methyl Violet
Blue	Victoria Blue
Reds	Rhodamine 6 G, B Conc.
Blacks	Fuchsine Oil Black Jet Spirit Nigrosine

are omitted in the above tabulation. Due to the poor solubility



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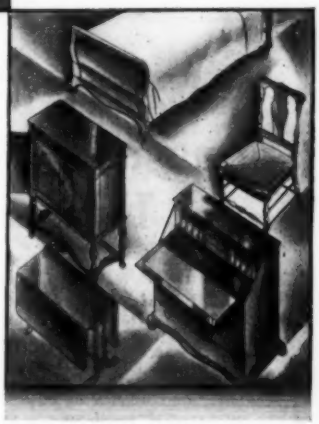

Lacquer finishes for modern furniture receive much abuse. Whether they stand up under this or not depends largely upon the lacquer ingredients. From the sanding sealer to the final finish, high gloss or flatted as you prefer, Teglac is the logical choice.

When makers formulate with Teglac they note how compatible it is with Nitrocellulose. Lacquer users note how it improves working qualities . . . note its freedom from gum blush . . . its almost marproof hardness . . . and its lustrous depth of finish. These are the appearance values that sell Teglac-finished furniture.

Teglac can be used in either clear or pigmented lacquer. Wherever demand calls for better finishes for furniture there is need for Teglac. Let us send you or your lacquer maker the full technical data. At the same time, if you are interested, we will send information on our other lacquer products: Rezyls, for outside endurance; Balsams for plasticizing; and Ethyl Lactate, a high-boiling solvent.

Industrial Chemicals Division

American Cyanamid Company

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of Bismarck brown, I have found it more economical and productive to use a mixture of Chrysoidine, Malachite Green, and Methyl Violet in the making of brown shades.

Difficulty is encountered in the making of jet blacks. Spirit nigrosine gives a good black but bronzes considerably in heavy solutions. Oil black, due to its stearic acid content, does not bronze as much and therefore is used to much better advantage.

In conclusion, I wish to advise against the employment of 100% alcohol staining solution. The alcohol content should be kept down to a minimum, the maximum limit being 15 to 20% of total solvent used. Articles colored with solutions of large alcoholic content usually have a dull appearance and the general quality of the material is impaired.

Filling and Staining in Wood Finishing

By
C. F. HUIZENGA

What a foreman finisher, experienced in furniture and cabinet finishing, has to say about the proper use of wood fillers and stains, which, he emphasizes, prepare the way for all following coats

FILLER, as the term implies, is a material used to fill the surface pores of wood before the finish is applied. Filler forms the base for subsequent finishing coats and it also imparts to the wood surface a certain amount of color. Filler, therefore, has a threefold purpose.

Beginning with the wood surface in the white, it is important to clean off all dust, using compressed air, a portable blower or a bristle duster. Usually a stain is applied first, except perhaps in the lighter walnut finishes wherein a bleaching solution is often used; and even then it is likely a stain will be employed to uniform sap streaks in the walnut.

Different woods call for different stains and fillers. Water and oil stains are probably the most commonly used, although lately, acid stain is being used more; also the newer "no-sand" stains are becoming very popular. Water stains require a longer drying period, before the wood surface can be filled, than do the acid and "no-sand" stains. An oil stain must be allowed a sufficient drying period, or the filler will remove much of its color, as the colors in both oil stain and filler are soluble in the thinning mediums used for thinning the fillers, namely V. & P. M. naphtha, benzine, gasoline, or turpentine.

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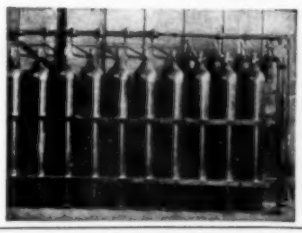


What Causes Cloudiness

I find much of the cloudiness in finished products is not a fault of the filler but of the stain. In mixing the stain, care should be exercised to thoroughly dissolve all of the powders; do not try to use an excessive quantity of a certain powder to get a darker shade. You'll only get a sort of thin paint and not a stain—but usually the "filler" will get the blame for the muddy appearance of the finished article.

Some finishers apply a wash coat of shellac after the stain has thoroughly dried. They use a heavy cut (3 or 4-lb.) and give the article a hit-or-miss spray; others use a 4-lb. cut reduced one to seven with denatured alcohol (seven parts alcohol), giving the article a fairly even coat.

I find the last named method best if a wash coat is needed. I seldom use it, although on the lighter walnut finishes it might be beneficial; but then again, bleaching lacquer is better, in my opinion. However, when a dark shade is obtained with water stain, a wash coat facilitates sanding, and on an oil stain it (a wash coat) seals the color to some extent against being lifted by the filler thinners. The "no-sand" stains need no wash coat of sealers, as water-soluble dyes are used in a solvent that does not raise the grain of the wood.

Several different types of fillers are available for the finisher; some dry slowly in from 36 to 48 hours and a fast one dries in 30 minutes for use under lacquer. In this article, I will deal chiefly with the slower-drying filler, as it is still in first place in many factories. There are fillers of finely and coarsely-ground components; among these are silex, quartz, lithopone and whiting—these being ground in oil; and dryers are added to speed up drying. The colors are also oil-ground colors, these being used in mahogany and dark walnut fillers.

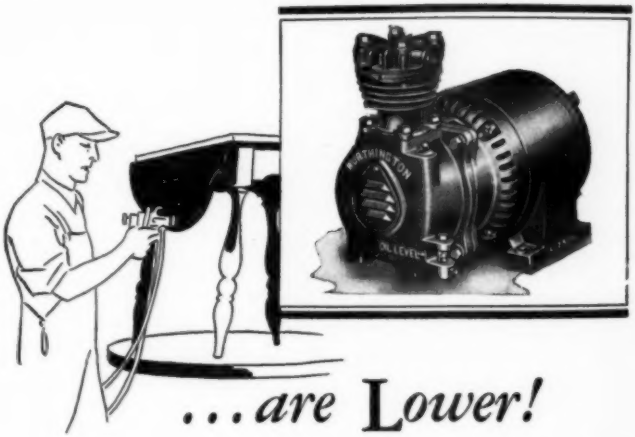
Preparing the Filler

These components are "ground-in" by the manufacturers so the filler comes to the finish user in a heavy paste form in the color suitable for one's particular requirements. This paste must be reduced for use by mixing it with a suitable reducer, as mentioned before. The best plan is to weigh each batch to be mixed and to use a specified quantity of paste filler and reducer each time according to the requirements of the wood to be filled—a heavy filler on the open-grained woods, and a thinner solution for the close-grained woods.

It is best to mix enough for one day only. I find, in mixing, that a small amount of reducer should be added at a time and well agitated each time; this seems to make the paste stay in solution better. This mixture must be agitated often, as there is a tendency for the components to settle. The proportion of oil and dryer used in grinding is generally about right, and all the user has to do is add the reducer; the adding of oil or dryer will often throw it out of balance. I have used some fillers that dried or set up too rapidly, and the addition of a small amount of boiled oil was necessary.

After the filler is mixed to the right consistency for the work at hand, it is ready to be applied to the wood. I prefer to use a brush for this work; on a large piece a 4-in. flat wall brush works very

Monobloc Operating Costs



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D-52

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well. This operation is called "daubing"; first the filler is daubed on, but it should be well brushed in. This brushing helps to press the filler down into the pores. After the filler is applied, it must be allowed time to set up or flatten. Then it is ready to be cleaned off, which is done with tow or sea grass, wiping with a circular motion until the excess paste has been completely wiped up.

Cleaning Off Excess Filler

The inside corners around mouldings, carvings and paneling should be cleaned with a pointed stick held under a cloth. If a brush is used on mouldings, care should be taken to avoid striking the adjoining surfaces, as this will pull out the filler and leave open pores exposed. After all the intricate or difficult places have been cleaned, the entire article should be wiped clean with a cloth containing a minimum of lint. Blow out all inside corners and intricate recesses around mouldings and carvings with compressed air, using not more than 50-lbs. pressure.

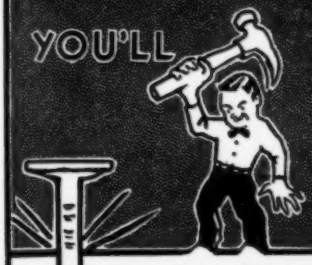
Many finishers have trouble in filling carvings, especially hand carvings, to match with surrounding surfaces. I use the following method and get a perfect match; Use regular stain, same as on rest of article; if it is dipped in the stain, blow out the carvings with air. This will cause them to be a trifle lighter in color because the stain has not penetrated as deeply as on the flat surfaces.

In the filling operation, apply filler that has been reduced more (50% more) with naphtha than the solution used on the flat surfaces. Use compressed air to clean carvings, and you will have a filled carving of the same color as the adjoining surfaces. It is not necessary to allow the filler to "flatten" before blowing it out of the carvings.

Let Filler Dry Thoroughly

The "slow-drying" type of filler drys by oxidation—air drying in 36 to 48 hours—but it can be forced in kilns so the drying time will be shortened to 24 hours. If a kiln is used, the existing percent of humidity will play an important part in the drying. In a dry kiln lacking suitable humidity conditions, the filler doesn't dry all the way down to the bottom of the filled pores; it acts the same as in the case-hardening of kiln dried lumber; only the top filler is really dried. Succeeding applications of finish will penetrate instead of being held up as on a thoroughly dry hard filler. Often this will cause the color of the filler to be

SAN-ITAI-RIE FILLER
Pat. No. 1638605
For All Defects in Wood
Manufacturers in all wood-using industries find SAN-ITAI-RIE FILLER unsurpassed in filling cracks, worm holes, knot holes, open joints, dents, pitch pockets, etc., and through its use are able to send out their products without a flaw.
Put up in friction top cans—half pints to gallons—in 20 different colors. Send for sample can.
SAN-ITAI-RIE FILLER CO.
Division of
164-170 W. Kinzie St. G. J. Liebich Co. Chicago, Ill.



BE HITTING THE NAIL RIGHT ON THE HEAD!

There can't be any half-way measures in formulating good lacquers—especially during the hot summer months. Good lacquers, dependable lacquers call for good, dependable solvents. That is why the coming "trouble months" create the heaviest demand for

PENT-ACETATE—PENTASOL and PENTEXEL

Stabilize your summer production of lacquers—hit the nail right on the head every time—by standardizing on Sharples Solvents for safety and satisfaction.

The SHARPLES SOLVENTS *Corp.*
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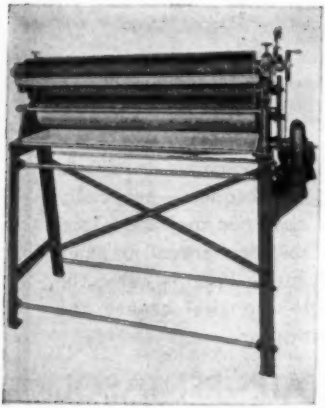
The NAZ-DAR Coating Machine

For Applying Lacquers, Enamels, Varnishes, etc.



Faster Production
Less Material Waste
More Uniform Application
Greater Coverage Per Gallon

A NAZ-DAR coating machine will show improved results over hand or automatic sprays on any sheet or strip material.

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Also Manufacturers of Silk Screen Process Paste Paints, Equipment and Supplies

bleached out by the lacquer, causing grayness and off-color conditions. It will also allow the first coat of finish to penetrate to such an extent that an extra coat will be required to get a full-bodied finish.

The color of stain and filler used on an article should not differ too much, as for example, a brown stain and red filler. They should be the same or nearly the same in color. A reddish filler on a brown stain will give a dirty appearance—more so if lacquer is used than varnish, as most lacquers will bleach a little of the filler color. I have seen jobs where the filler was just a bit too light in color for the stains used; this also gives an unsightly appearance—the filler could be plainly seen in every pore. It is always better to use a lighter stain and a darker filler when the stain and filler differ in shade.

On some woods such as walnut and oak, the colors in the filler can be used as a stain—"a combination stain and filler." Some beautiful effects and colors can be had from using this prepared filler just as it comes from the maker, that is, adding only diluents—no colors. Be sure to select a filler having the desired colors.

I find that most of the fading of fillers is caused by conditions previously mentioned, but may I emphasize the absolute necessity of always having a dry filler under lacquer? Test the filler from time to time; it may vary, as the manufacturer is also susceptible to mistakes. A very good test is to flow some of the mixed filler on a piece of glass; put in the kiln with the regular work at night and test it next morning. If it is not hard all the way through, it is not right; usually too much oil.

Wherever (INDUSTRIAL TAPE) *is used*

JONFLEX

Masking Tape with Precision Edge in actual everyday service has proven speedier, cleaner, more economical

Have you seen the new Johnson's Tape Dispenser? Holds full size roll of tape up to 1¼ inches wide. Enables you to cut any length of tape instantly. Eliminates pre-handling—no waste.

ASIDE from precision work, the use of this tape has been found more practical and economical when used to shield one color while working on a two or more color job. To protect furniture surfaces against damage or spray on a refinishing job—to protect machine finished surfaces or nickel-plated parts or prevent lacquer from covering contact surfaces on electrical equipment. For masking inlay work, covering marquetry while shading, for aeroplane finishing and decorating, on experimental work, for masking, stenciling and striping on radio cabinets and incubators. In fact, for every industrial purpose, Jonflex will give greater satisfaction and speed work at less cost.

Sample Roll Free!!

JOHNSON & JOHNSON, New Brunswick, N. J. I. F. A.

Please send free sample roll of Jonflex Industrial Tape and information on the Tape Dispenser.

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Company _____

Street and No. _____

City _____ *State* _____

Questions and Answers

This service department is conducted to meet the reader's need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer any further comments, or recommendations pertinent to subjects mentioned

Black Streaks; Walnut Veneer; Lacquer Rubbing

We have considerable trouble with black streaks appearing in walnut veneers after oil rubbing. In rubbing, we use a mixture of straw oil and naphtha (a 50-50 mix) and are wondering if there is something in the naphtha base that causes this result, and if we could get rid of it by substituting some other cutting agent. These black streaks show up more often around the 4/4 butt joints, but at other times they are in the middle of a regular plain walnut panel.—E. F. Mfg. Co.

If this firm is using varnish, I can see no reason for these black streaks appearing in walnut veneers after oil rubbing. If the finisher is using lacquer, I can see his trouble; it may be he uses the lacquer coats too thin, or not enough coats of lacquer, and he may rub this too close so the oil penetrates into the veneer, causing the black streaks.

From the way the black streaks show up in this work, the finisher may be rubbing too close in spots—rubbing too much in one place causes friction—therefore he should rub evenly all over the panel.

In regard to the 50-50 mix, I suggest using paraffin oil instead of straw oil, and cutting it with benzine, which is quick drying and will help dry up the oil. It may be that the streaks show up more around the 4/4 butt joints because the veneer is not glued to the core properly.—T. R. Nall.

To Remove Accumulations of Finishing Material

We wish to clean up our spray booth preparatory to keeping it clean permanently. In the spray booth, especially on the floor, we have quite a thick accumulation of dried-up hardened gum, mostly from lacquer. It is practically impossible to scrape off this material in its present state. Is there any chemical or solvent that would soften it up so it can be scraped off?

The floor of the finishing room is covered with an accumulation of dried filler, pumicestone and rubbing oil. What could be used for loosening this up so it could be cleaned off? And after it has been cleaned off, what could be done to make the task easier for keeping the floor clean permanently?—K. M. Co.

To clean up a spray booth, soak the gummed surfaces well with an especially prepared material, advertised in this magazine, and chisel off the old coating; use a

Free Trial Offer

Use sufficient of a 5-gal. can of SPEE-D-DRY Filler and Solvent to give it a thorough test. If it does not answer every demand of a quality filler, return unused portion and full credit will be allowed without quibble or question.

Ask About It!

Stille's SPEE-D-DRY Wood Filler

Effects tremendous savings . . . . speeds up production . . . establishes better finishing standard

Here is a material that meets every requirement for a wood filler, a thoroughly dependable product that has found its way into finishing rooms of hundreds of industrial concerns. The saving of time, labor and floor space through SPEE-D-DRY Filler application has contributed to more profitable operation and raised finishing room standards.

Consider these points: SPEE-D-DRY Filler penetrates deepest pores; will not pull out; *does not* raise grain . . . bleed up through finish . . . . require sanding . . . . shrink or crack. Is furnished in any color, transparent and natural. Can be prepared to any depth of tone to arrive at exact color finishing.

But try it yourself - - these and other advantages will effect tremendous savings in your finishing department, speed up production and establish a better finishing standard. Give it a test at our expense.

E. T. STILLE & COMPANY

Main Office and Factory

2343 Greenview Ave. Chicago, Illinois

Southern Office and Factory, High Point, N. C.

brass or copper chisel to avoid making sparks. Then grease the interior walls and ceiling of the booth and stick on wrapping paper, changing this from time to time as required. As for the booth floor, I suggest you cover it with heavy coated builders' paper. This is stiff enough to hold its shape and take the wear, and it is cheap enough to be replaced as often as required.

For the finishing room floor, a potash solution will soften up the accumulations of filler and other materials around filling stands and at the various places where finishing material is applied. When once cleaned, a layer of builders' paper, to catch the future surplus material, will probably be the most economical way to keep the floors clean.—A. B. Laboratories.

There are several products on the market especially prepared for cleaning spray booths and finishing room walls and floors. One, a white powder,* is mixed with water and sprayed or applied by brush. This softens the accumulations. Another material is a solvent that will soften and dissolve the hardened gum.

It is advisable to clean booths and finishing rooms for other reasons than that of fire hazard alone. A thorough cleaning at least once a week at a regular time, such as Saturday afternoon or on a certain evening, is recommended. Varnish remover or lacquer thinner may be used to soften these accumulated materials enough so that they can be scraped off a little at a time.

Once the spray booth walls, ceiling and floor are clean it is the practice in some factories to coat them with grease and then press paper over the grease. Then, when the booth is to be cleaned, all that needs to be done is to strip off the paper and clean the fan.

Obviously this method is not adaptable for the finishing room floors and walls. For these I suggest that sheet iron or other sheet metal in about yard sizes be placed where the accumulations are greatest. Filler, rubbing oil, and some other finishing materials will not adhere to metal. The accumulated material can be easily scraped off this metal in a short time without the aid of chemicals or solvents.—W. R. Beutin.

*Name on request

Odorless Refrigerator Finish

We note an interesting article on "Finishing Refrigerators" by Mr. Napoleon F. Fine in December issue (page 86).

We are up against the problem of finishing refrigerators which are really odorless. The interiors of the refrigerators are galvanized iron and our process is as follows:

1—Wash over with acetic acid.
2—Spray white oil primer.
3—Spray two or more coats white surfacer, using odorless thinners.
4—Sand off and spray with odorless lacquer and thinner.

There is an odor of lacquer still noticeable after a week or ten days. Can you recommend any particular process and name makes of lacquers which will give us a job that will be really odorless in about 24 hours after finishing? M. W., Auckland, N. Z.

Your present scheme of finishing the interiors of refrigerators calls for too much material. Where four coats of material are used in the interior it is almost

Interesting FINISHES *are reflected in sales*

INVARIABLY, there is sales-compelling power in a product finished in an interesting manner. For by the finish customers first come in contact with a product — by the finish they are attracted to it, held to it. That finish must be right—in freshness, in originality, in timeliness.

Finishes of this sort are our specialty. To be sure, we are engaged in the manufacture of high grade finishing materials. But more important, we are also engaged in the creation of new finishes for clients — finishes so interesting and compelling that they cannot help but command sales.

May we serve you in a like manner?

The
ROCKFORD VARNISH
Company
ROCKFORD, ILL.

impossible to get complete evaporation and oxidation, hence there will always be more or less odor.

We have done quite a bit of experimenting with lacquers for interiors but have been unable to find any which do not leave a faint odor for some little time. We therefore suggest that two coats of baked enamel be used. The procedure in this case would be as follows:

Wipe the metal clean with acetic acid if there is much oil; otherwise a dry rag may be used. Apply a medium coat of a good long-oil primer and bake at least three hours at 160° F. This should season out overnight, and then a good full coat of white enamel should be applied. This should be baked about 2½ hours at 160° F. and also allowed to season overnight. If this procedure is followed, there should be no more trouble due to odors.

There are several concerns making a good grade of enamel for this purpose. . . . advertisers in this magazine.—Napoleon F. Fine.

Decorative Finish for Swedish Iron

Referring to June issue, pages 76, 78, 80 and 92, where there is published a question and two answers relating to the Swedish iron finish, I feel inclined to disagree with the suggestions and recommendations given in both answers.

I believe there is only one suitable finish for Swedish iron and this is the real, old-time, original finish prepared and applied as follows:

Into some boiling hot turpentine chip off a small quantity of shoemakers' black wax and stir until it is the consistency of cream. Apply this to the raw iron with a brush and wipe off the high spots a few minutes after application. This wiping can be done several times as the more this finish is wiped, the more beautiful it becomes. This finish also serves as a rustproof coating for the iron.—Frank J. Lane.

Acid-Resisting Finish for Motors

Our line consists of electric motors many of which are used for special applications. In some cases the machines are subject to the action of certain chemicals, including acid conditions, attacking the metallic parts of the motor, thus shortening its life. We have been considering covering the outsides of our motors with some acid-resisting metal such as lead or possibly aluminum. The construction of our machines is such that it would not be practical to dip the whole unit into a bath of the hot metal and secure a coating in this manner.

We understand there is available a process of separating the molten metal on the motor frame and other parts which are attacked by acid, to form a protective coating. We would greatly appreciate any information that may be furnished, as well as the names of any companies who specialize in these products.—T. L. A. Co.

Motor housings and machinery may be finished as follows to withstand the action of chemicals:

First, spray on a coat of sanding primer* and let dry 24 hours. If rough, spot putty and then, if the surface requires it, give a sec-

*Name on request.

The above is a photographic reproduction of M & W Prismlac

CLEAR PRISMLAC No. 23

The New and Different Decorative Finish

Applicable to Smooth Metal, Wood or Composition.
Just Spray and Watch it Crystallize.
Air Dries in Less Than One Hour.

May We Suggest How PRISMLAC May Be Applied to Your Product?

MAAS & WALDSTEIN CO.

Executive Offices and Plant
438 Riverside Ave. Newark, N. J.
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WATERPROOFED

CADILLAC SHELLAC

retains all the good qualities of Pure Shellac—and is UNAFFECTED BY MOISTURE. Send for sample for trial.

CADILLAC SHELLAC COMPANY
INC.
Ferndale (Detroit) Mich.

Hy-Speed
EXPLOSION-PROOF
ELECTRIC MIXERS
Clamp to *any* tank
and mix *all* liquids

MIX QUICKER
LAST LONGER
COST LESS

ALSOP
ENGINEERING CO.
39 West 60th St. New York

ond coat of sanding primer. When dry, sand with wetordry sandpaper and water.

Second, spray on a coat of black or colored lacquer.

Third, apply a double spray coat of flexible finishing lacquer. This is not a nitrocellulose-base product, and we believe it will stand any abuse to which it may be subjected.—A. B. Laboratories.

Acid Proof Finish

We have a job at the factory where I am employed calling for a dull black finish on maple that will stand an alcohol and acid test. I would appreciate it very much if you could give me any information on this.—W. K.

I know of nothing better for this particular piece of work than what is known as "Acid Proof Finish," which is used on table tops in most all laboratories. This finish is especially adapted to withstand the effects of acids and chemicals in general.

In February 1929 issue of INDUSTRIAL FINISHING, page 74, J. K. Cooper's article about "Acid Proof Table Tops" covers this subject pretty well and includes formulas that are satisfactory. However, I will give you the formula I use, which differs somewhat from Mr. Cooper's—but either one will be found to be perfectly satisfactory:

FORMULA: ACID PROOF FINISH

Apply alternately 1, 2, 1, 2.

Solution No. 1

Copper sulphate	(gms.) 100
Potassium chlorate	(gms.) 100
Water to make	(cc.) 1000

Boil to dissolve, apply hot; 2 coats

Solution No. 2

Aniline oil	100 cc.
Hydrochloric acid	150 cc.
Water to make	1000 cc.

Apply cold; two coats

Allow all coats to dry; then wash with soap and water. Finally, finish with equal parts of raw linseed oil and turpentine.

Formula for That "Dev" Oak Finish

Referring to E. R. J.'s question on pages 79 & 80 of July issue, the formula for "Dev" oak finish is as follows:

If oil stain is desired, use about 1-lb. of Venetian red to four gallons of benzine. If water stain is desired, use a water stain powder as nearly like the Venetian red as possible.

Fill with a very dark reddish brown filler, allowing time for stain and filler to dry in between applications. Use a reddish brown lacquer shading stain *.

Start shading from the outer edge and shade toward the center, leaving the inside lighter. One can get the shade desired by more or less shading. This gives the wiped-out effect. Use half orange shellac and half white shellac (a very thin coat) cut thin with alcohol. Then smooth up by using No. 2/0 steel wool, but be very careful to avoid picking up the shading in this operation.

Finish with as many coats of lacquer as desired. Flat lacquer will produce the rubbed effect but if E. R. J. wants to rub this by hand, I suggest using gloss lacquer.—T. R. Nall.

Orange Peel; Cause and Prevention

This condition—s o m e t i m e s known as "pebbling" or "pockmarking"—is found only on surfaces that have been coated with a spray gun. It is caused by failure of the lacquer or other finish-

* Name on request.

Check Your Finishing Results

WITH J-W-F products you are sure of dependable results. Rigid adherence to specifications — endless testing — constant research — all combine to guard their quality and maintain their uniformity.

If you are not entirely satisfied with the finishing results you now obtain—or if you are open to conviction that possibly there might be a more satisfactory finish than the one you now use—try J-W-F products.

Put them to test in your own finishing room — and then check results. Nothing we might say will be half so convincing of the real worth of these finishes as this test in your own plant.

We are also prepared to assist you in developing special finishes to meet special requirements—Write.

■

Jamestown Wood Finishing Co. products are guaranteed. If they will not do for you what we claim for them your money will be refunded.

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BRANCH OFFICES: Milwaukee, Wis. Meriden, Conn; New York City; Lenoir, N.C

STAINS - FILLERS - SHELLACS VARNISHES - LACQUERS - ENAMELS

Finco

NON-GRAIN RAISING

Water Stain—

requires ***no sanding . . . . . no wash coat*** . . . . saves 24 hours in the finishing room. One furniture manufacturer saves $1.50 on every dining room suite.

Positively fast to light . . . . made only from water aniline colors. Inquiries solicited. We will be pleased to demonstrate this product or send samples for you to try . . . . Our service department is at your disposal.

Finishing Products Co.
3725 E. 13th St. Indianapolis, Ind.

New type—ultra modern "Air Exit" Ventilating and Drying Fan . . . 2 to 6 blades

Aeroplane Propeller fan blades are universally recognized as the most efficient and economical . . . and the blade which our engineers have designed and developed (constructed of Nickel Alloy Aluminum) is practically perfect in these respects.

Note exclusive motor bracket—gives better frame support and can be adjused to fit any motor.

Write for price and descriptive circular . . you'll be surprised.

AIR-MORE PRODUCTS CORP.
3402 Northwestern Ave. Indianapolis, Ind.

ing material to level out to a smooth surface; leaving the surface rough like the peel of an orange.

The most common cause of orange peel is improper adjustment of the air pressure in relation to the opening of the spray gun nozzle. If the air pressure is too high, a certain amount of the volatile thinner in the material will be blown away, leaving the material too heavy in body to flow out smoothly. The same would be true if the gun were held too far from the surface being sprayed, or if the finishing material is not properly reduced.

If the air pressure is too low, the material will not be properly atomized, leaving it too heavy to flow out. This also would be true if the gun were held too close to the work, the material hitting the surface before being properly atomized or broken up.

A little practice will enable the operator to properly adjust these conditions. It is necessary that this be done with each different material sprayed, as the correct air pressure and nozzle opening satisfactory for one material will probably not be satisfactory for a material of different viscosity. Once established however, these adjustments will always be correct—provided, of course, that the same viscosity is maintained.—R. J. Fairburn.

Clean-Up Paint-Up Helped This Plant

A Canadian manufacturer was pleasantly surprised at the result of the adoption of a thorough clean-up, paint-up program at his plant. He lists the more important benefits as follow:

1—Advertising value of clean

ADVERTISING PAGES REMOVED

plant—an indication of a superior product.

2—Better health of employes reflected in an improved attitude toward their work and less disruption from time-offs.

3—Lower insurance rates from better plant condition—cleanliness reduces fire hazard; in this particular case a saving of $5,000 per year on insurance was made. This amount is more than sufficient to provide labor to keep the premises in a high state of cleanliness.

4—Uniform work clothes have been adopted and in some departments smocks and caps are worn. This attention to the individual's appearance is reflected in more careful, accurate work.

As in this case, unlooked for and unexpected advantages are often found in such a campaign. Cleanliness leads to a high state of efficiency, both in the human being and in machines and their operation. Botched work looks glaringly out of place in a well-kept and clean plant.

Wood Wheel Finish

I have observed cases of the finish chipping off from lacquer-finished wood wheels of automobiles. Possible causes include a poor job of priming or low-grade priming material, or the use of lacquer that is unsuitable or lacking in durability for outside service, but what is probably the more frequent cause is improper drying of the wood wheels just before finishing begins.—W. E. Warner, London, Eng.

Automatic sprayers are being arranged to spray small articles as they move past on a conveyor.

Reduced from Panel 10"x14"

Crystal Finish
on
Soft Wood
Using
CRYSTAL
SEALER
FOR
UNDERCOAT
Write for Particulars
HENRY V. WALKER CO.
Elizabeth New Jersey

New Materials and Equipment

Presenting briefly, certain outstanding features of new or improved materials, supplies and equipment which have been developed and made available for use in modern industrial finishing departments

Non-Glare, Improved Galax Globe

A new semi-indirect globe of a different and unique type of glass has just been placed on the market as the newest product of the Macbeth-Evans Glass Co., Charleroi, Pa. The new enclosing globe, called Galax, is a single

The large globe which surrounds the lamp gives the high diffusion necessary, with resulting low brightness and extremely soft shadows.

piece of homogeneous glass, semi-indirect, with white reflecting, glareless bottom and slightly diffusing top of high transmission. Part of the light is diffused and transmitted through the bottom of the globe. The rest of the light is reflected back through the top and reflected from the ceiling.

It has been suggested that this globe provides an especially desirable means of illumination for finishing departments as the eyes of the workmen are protected from the brightness of the lamp filament by the type of the glass in the lower half of the globe, and at the same time that there is this protection and no direct glare, the upper half gives high transmission efficiency.

Heater Equipment for Japanning Ovens

The Paul Maehler Co. (industrial oven builders) 2208 W. Lake St., Chicago, Ill., announces the development of an entirely new type of industrial oven heater, known as the Maehler-Universal heater.

The use of low pressure heated air places the heater outside the oven where it is accessible at all times during operation and permits the use of efficient heating equipment.

The circulating medium is drawn from the top of the oven by a high temperature suction fan located at the exhaust end of the heater, passes through the heater and returns through the fan to the bottom of the oven. The fan, being of the suction type drawing the air through the heater, and an independent throat and air intake for gas combustion being provided, a soft, quiet visible burner flame is produced and the use of a visible pilot and automatic electric ignition is possible. An adjustable fresh air inlet at the intake end of the heater permits the introduc-

OAK FAVORED IN PERIOD DESIGN

Oak Furniture in Period design and finishes is again popular with the buying public and is today disputing first place with Walnut as a favored wood for Dining Room Furniture.

And Oak has many advantages. It is easily obtainable, reasonably priced, of good tensile strength, easily worked and for these reasons generally preferred by the Furniture Manufacturer. Its grain and the general characteristics of Oak make it possible to produce a wide variety of colors and effects in its finish.

But the Manufacturer must give careful consideration to the finish of Oak suites for it will depend entirely upon the attractiveness of color and finish whether the demand will stay with us and increase or prove to be but a passing fancy.

There is a rather wide range of color effects but as a general rule the finish should correspond with the design of the furniture. Ground colors vary from the cold tone of Black Brown to the warm, rich Red Brown and all the intermediate shades. There are designs demanding the wide open Black pores while others call for the dusty wax effect in wide open pores. Care must be exercised so that these features are not overdone.

Other designs show a semi-closed pore. Outer edges of panels, beads, on turnings, high parts of carvings and mouldings display highlighted effects of a conservative character. One thing is noticeable. All new Oak finishes have an extremely smooth, close to the wood, wax finish effect.

We have been in co-operation with many of the leading Manufacturers developing some of the most popular Oak finishes of the day. We should be glad to extend our service and co-operate with you along the same lines. When preparing to bring out a new suite in Oak, we suggest you send us a case front and let us finish it in the correct, up-to-the-minute Oak finish. The kind of finish that will help sell the furniture.

You assume absolutely no obligation. Our service includes this kind of co-operation.

THE GILBERT SPRUANCE CO.

RICHMOND AND TIOGA STREETS

PHILADELPHIA

VELVET DRAWCOTER
The perfect furniture interior finish, which dries hard in about 20 minutes and leaves a satin finish without raising the grain of the wood. VELVET DRAWCOTER is waterproof and can be rubbed and polished as desired. It can be reduced with ordinary grades of naphtha. VELVET DRAWCOTER is manufactured in clear and transparent orange and mahogany colors, producing a most beautiful finish. You are interested so write us.
Southern Lacquer Co.
BALTIMORE MARYLAND

THIS NEW TWIN-CYLINDER

PORTABLE AIR COMPRESSOR

With a Capacity of 4.35 cu. ft. of Free Air Per Min.

WILL FURNISH A SUFFICIENT AMOUNT OF AIR FOR ALMOST ANY KIND OF COMMERCIAL SPRAY PAINTING

$105.00 Net

Write Today For Descriptive Circular and Further Details

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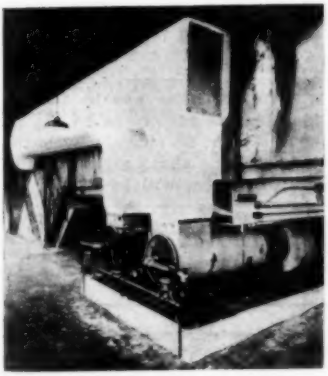
Saylor-Beall Mfg. Co. 1501 E. Philadelphia Ave. Detroit, Mich.

tion of fresh air into the heater at room temperature, when desired.

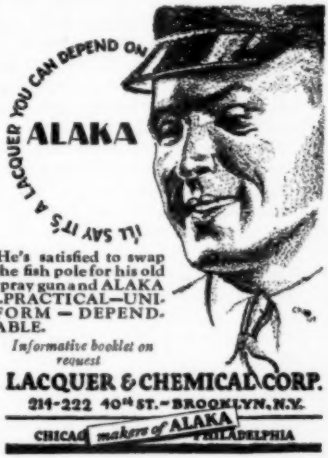
In the operation of the heater, the air from the oven with its vapor content passes through the heater flame where all explosive gases developed in the oven are incinerated. Thus the dangerous vapors are completely destroyed and in their destruction a notable economy is effected, the burning of the vapors generating approximately 150,000 B. t. u. per gallon of enamel distilled from work in process. As the entire volume of



This heater includes the valuable recirculation feature which provides additional economy.

circulating medium passes through the heater many times a minute, it will be seen that it is never possible for it to contain sufficient volatile vapors to create even the slightest possibility of explosion.

The heater, which under repeated tests has shown a continuous efficiency of 95% to 99%, operates at 33 1/3% above oven temperature. At 450° F. oven temperature, for instance, the circulating air is normally returned to the heater at 400° F., and it is therefore necessary to



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raise its temperature but 50% to maintain the oven temperature. Fuel economy is readily apparent. A highly accurate thermostatic control, which can be set for any desired temperature, controls the fuel flow to maintain the oven temperature at the setting.

Notwithstanding the constant recirculation of the air, repeated tests have shown the loss in the oxygen content of the circulating medium never exceeds 2%, even after many hours of operation. The oxidizing effect of the air is, therefore, in no way reduced, nor can it possibly fall to a point where there is danger of explosion.

Full circulation of the air to all parts of the oven is provided by the slight plus pressure generated and the variation in temperature at any two points in the oven is rarely over 6° and never over 10°. The floor, usually the coldest part of the oven, becomes the warmest.

Using slotted ducts for the delivery of the heated air to the oven, and for the exhaust, the full dimensions are made available for work-in-process, and the walls are smooth and readily cleaned and kept free from dust.

An ingenious system of safety controls is provided on the heater itself to guard against fire or explosion resulting from failure of the gas or electricity. A new oil-fired model recently perfected operates on the same principle and is provided with the same complete safety control.

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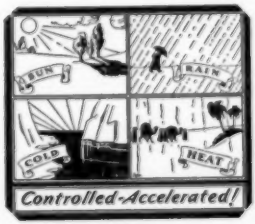

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Office; 802 Wulsin Bldg., Indianapolis, Ind. Telephone, Riley 6771. President, A. T. Gaumer; Vice-President and Managing Editor, W. H. Rohr; Secretary, R. E. Suits; Treasurer, E. A. Doech.

Subscription rates, $2.00 per year in U. S. and possessions; $2.50 per year in Canada and $3.00 per year in foreign countries.

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EDITORIAL

Sales and Styles at Furniture Show

Sales higher than in January; improvement in fall business forecast; Early American leads style parade—this briefly sums up news of the American Furniture Mart which came to a close Saturday, July 19, after two weeks of activity.

According to V. L. Alward, president of the Mart, "not only was attendance heavy, but probably as great a number of orders were placed as at any other market, although the volume was lower than at previous exhibitions. This is important because it indicates that merchants generally are without stock on hand to meet fall demands. Apparently, there is a growing conviction that business generally is due to improve this fall and winter, and wide-awake furniture men came to the market in order to be fully posted and equipped to get their share of the sales when the revival really arrives."

With more than 700 exhibition spaces in the building, all enjoying more success with one design than another, it was difficult to fix any decided style trend. It was evident, however, that Early American designs, expected to be among the leaders, were even more popular with the retailers than had been anticipated. Several manufacturers, after the market, declared that Colonial furniture, instead of being on the decline, promises to maintain its present position.

Provincial furniture of other countries ranked high in the race, the new French pieces, especially, attracting wide attention. These, in partnership with Early American, are expected to continue in prominence through January.

The 18th century designs, including those based on the designs of Sheraton, Hepplewhite and Chippendale, lived up to their advance notices. Those of authentic character, especially, enjoyed a good sale, filling a market for Georgian furniture that never seems to fail. Queen Anne pieces were plentiful; several suites of Spanish inspiration, especially for the dining room, attracted a good volume; and Early English was conspicuous in several spaces.

Generally speaking, the lines stressing correct style interpretation, regardless of the particular period, appeared to be leading the way. Better furniture was in demand. The diversity of tastes that is typical of human nature insures a demand for many varieties of furniture, but the public, more style conscious than at any time in the past, is demanding furniture styled correctly in each period.

Of the woods, maple appeared to stand out, although it doubtless ranked behind walnut in volume. Oak, which has been gaining ground recently, was represented in almost every display. Mahogany held its place as the proper medium for a number of designs, being especially prominent in more formal pieces. Alder, found chiefly in California, caused some comment; chestnut was used more extensively than in January; and dozens of other woods were represented, especially in unusual veneers.

Modified moderne continued rampant in the porch and sun parlor division of the industry, although this design was noticeably absent elsewhere. "Art Moderne," as it originally appeared, is now, of course, entirely dead. More of the modified pieces are expected to make their appearance in January, the vanguard of a new renaissance of this style.

Several of the newer materials used in furniture making appear to have established a place for themselves. Formica, for example, was widely used. Aluminum made its debut as a complement to the tubular steel of last year and the steel reappeared, but largely in tubes of smaller dimensions. The new tops for kitchen tables and cabinets that refuse to stain, regardless of the fruit juices, milk or other liquids poured upon them, appear to have given a new lease on life to the kitchen equipment field.

Moving pictures of processes and methods can inform and "sell" a whole organization at once.

What would fine furniture be like if it were not for the careful work of the finisher?

Present Business Conditions—a Significant Suggestion

Existing business conditions coupled with the downward trend of prices are providing means for the manufacturer to learn many new things about his own business. It is just as much a period of readjustment as that immediately following 1918. Any manufacturer who does not face the existing conditions with optimism and an openminded desire to adjust his business to meet these conditions is hopelessly lost.

Lower commodity prices are forcing conservative measures upon the manufacturer. Radical changes are taking place in both wood-finishing and metal-finishing processes. Based on intelligent experimentation, finishing schedules are being shortened, modern combination materials and equipment are taking the place of obsolete, slow-drying, single-purpose materials and hand methods.

Hand-to-mouth buying all along the line is bringing its share of difficulties in increased overhead expenses to handle the larger volume of individual small orders, and it is causing spasmodic production which has a tendency to increase manufacturing costs.

Coordination of all departments, concerted action by all employes toward conservation and a well balanced, controlled overhead expense are three vital necessities as long as present conditions exist.

Controlled Air; Distributed Heat; Adequate Ventilation

There are some good reasons why heat should be controlled and distributed in the industrial plant in a way similar to what is used to control and distribute electricity. For the proper electrical distri-

(Continued on page 85)

PAGES REMOVED

Controlled Air; Distributed Heat; Adequate Ventilation

(Continued from page 82)

bution of power we have transformers of almost unlimited capacity for "stepping down" high voltage, and frequency changers that make higher speed machinery possible. Every plant owner recognizes the fact that power transmitted and distributed electrically represents money, and he takes the proper steps to not only use it conservatively, but to prevent its waste.

Today there is available equipment designed to collect wasted heat from kilns, drying ovens and rooms, and distribute this heat at any desired temperatures anywhere in the plant. Cool outside air can be forced into the system to reduce high temperatures, and auxiliary gas-fired or steam booster units can be employed to raise the temperature.

This equipment is especially adaptable to those plants that have wood finishing departments From wide and varied observation it has been found that the medium and small-size plants are deficient in the use of controlled air in their finishing rooms. Irrespective of what type of materials are being used, or the process employed, there is a real place for controlled air for drying the finish. This will save time and perhaps conserve valuable heat that at present is being wasted.

How to Judge a Finish

The National Committee on Wood Utilization is preparing a bulletin on, "How to Judge a House." Quoting an announcement from the Department of Commerce under date of July 23, 1930: "This publication will discuss the

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planning, designing and construction of houses costing less than $15,000 in connection with which wood is used as an important structural or finishing material."

There is no question as to the value or desirability of such a publication to the prospective home builder or buyer. Likewise there is no question as to the value of authoritative knowledge regarding what constitutes good construction in a house, but the floor plan, design or type of architecture and the finish of the interior woodwork and floors are three things that may be seen by the home builder or buyer and, in all probability claim most of his attention.

Hence it would seem the better part of wisdom to include in this bulletin, advice on various wood finishes and suggested finishes for different kinds of woodwork to obtain the best effects. This would remove much of the layman's uncertainty and prevent many poor jobs and monstrosities in finished interior trim which may be seen in houses costing $15,000 and more.

Visualize the background that your product will have and then select a finish that will harmonize with it.

Classified Advertising

Advertisements under this heading 45 cents a line per insertion, minimum charge, $1.35. In estimating, calculate six words to one line, and add one additional line for heading. Use this department to obtain help, find positions, buy and sell equipment, dispose of manufacturing properties, etc.

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